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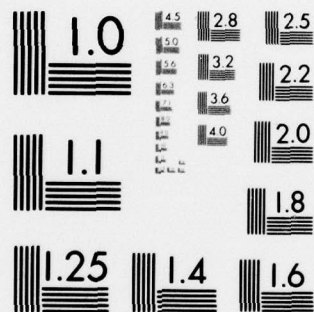
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A STUDY OF MEETING AND
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JULY, 1979

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Abstract - continued

meetings were held; (3) the pattern and nature of communication interactions among participants; and (4) the use made of supplemental communication aids such as audio-visuals and graphics.)

Meetings were compared to determine if and how associated communication requirements differed due to: (1) the group conducting the meeting (academic, business, or government), (2) the purpose of the meeting, and (3) the size/complexity of the meeting. Group differences, that is, whether a meeting was academic, business, or government, had essentially no effect on any important variable tested. Meetings of the three groups were similar in nature and in almost every communication process. Differences due to purpose were untestable because meetings were not conducted for single purposes; rather, meetings served multiple functions. Meetings did differ along a size/complexity dimension. Three distinct types of meetings--small, medium, and large--were identified and shown to differ in complexity and communication characteristics. Implications of these and other observed differences among meetings for teleconferencing system design are discussed.

A Study of Meeting and Conference Behavior

Mark Allan Brecht

Based on a dissertation submitted to The Johns Hopkins University in conformity with the requirements for the degree of Doctor of Philosophy.

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I wish most of all to express my gratitude and love to my wife, Barbara, for her supreme understanding and support throughout these many years.

Finally, a meeting would be nothing without the people involved and so, it is to the many participants who allowed me to share their collective enterprises that I dedicate this report.

Introduction

Teleconferencing systems currently offer attractive alternatives to face-to-face communication for meetings and conferences to which participants would normally have to travel. Because these systems allow conferees to conduct their business via telecommunication links rather than in person, the potential savings in both time and expense can be substantial. The cost of travel can be greatly reduced or even eliminated, and time previously devoted to travel can be put to more productive use.

For these reasons, the development of teleconferencing systems by private and government interests alike is proceeding briskly. The introduction of commercial systems such as Picture-phone[®] and Confravision has fostered a competitive atmosphere and has led to the expenditure of considerable amounts of money and effort for telecommunications research in corporate research organizations and in government-sponsored university laboratories both in the United States and abroad.

The teleconferencing systems developed as a result of this research vary in the degree to which they duplicate traditional face-to-face interactions, but all the systems try to overcome the physical separation of "tele-conferees" by the more-or-less faithful replication of important aspects of face-to-face communication. That is, they mimic or try to mimic certain features of face-to-face meetings. This applies not only to simple audio networks that merely allow several conferees to talk to each other, but also to highly sophisticated audio-visual systems in which conferees can see and interact with fellow participants via closed-circuit television. The future success of all such systems may depend in large part on whether the important aspects of face-to-face meetings can be identified and on how well those important features can be provided for in teleconferences.

Until now, much teleconferencing research has concentrated on finding ways to adapt new communication technology to teleconferencing situations. That is, research and development has been technology driven with primary concern directed toward finding out how well people can carry on conferences when they are provided with sophisticated technological devices such as video telephones, closed circuit television, and interactive computers. From a systems perspective, this research seems misdirected. Rather than asking, "Can

people adapt to this or that new communication mode?" researchers should be asking, "How do people normally carry on conferences?" "For what purposes do they have conferences?" and "What facilities would people need in order to carry on conferences if they were separated from each other?"

Unfortunately, these are difficult questions to answer. Very little is known about how or why people conduct meetings, about what goes on at meetings, or about what communication needs conferees have. The data are just not available.

To be sure, we are not totally ignorant about face-to-face meetings and conferences, but much of what is known is only marginally relevant to the design of teleconferencing systems. For example, the voluminous social psychological research on small group dynamics that includes studies of leadership (Fiedler, 1962; Gibb, 1947, 1950; Kipnis, 1958), communications networks (Leavitt, 1951; Shaw, 1955), the shift to risk phenomenon (Marquis, 1962; Wallach, Kogan & Bem, 1962), conformity to majority opinion (Asch, 1956), and the effect of group size (Barker & Gump, 1964), is useful for understanding how people function as a group, but few of those findings are relevant to understanding specific communication needs at meetings and the way those needs can be satisfied. Even when social psychological studies have been conducted in a telecommunications context, the emphasis has generally remained on interpersonal variables. For example, in the Wired City Laboratory at Carleton University in Ontario, Canada, groups meeting face-to-face were compared with groups meeting via closed circuit television to study the emergence of leadership, the shift-to-risk phenomenon, and the use of power (Coll, George, Strickland, Paterson, Guild, & McEown, 1975). Similar studies conducted by the Communications Studies Group in London, England, have examined how persuasion (Short, 1972), negotiation (Short, 1971), and coalition formation (Williams, 1975), are affected by telecommunications, but again, the variables studied have been social psychological in nature.

Research by Thorngren (1970) is somewhat more pertinent. In an attempt to classify types of managerial meetings, he proposed a distinction among programmed, orientation, and planning activities in meetings. Programmed meetings were characterized as routine, repetitive, and standardized, in part because they involved regular contacts between individuals who were well acquainted with each other. Furthermore, the subject matter discussed at these meetings was quite specific, for example, placing merchandise orders with vendors. At the opposite extreme were orientation meetings in which the participants were not well known to each other. The subject matter was general, and often novel, unstructured, and complex. Between programmed and orientation meetings were planning meetings in which participants typically implemented courses of action that had been decided on at orientation meetings.

Thorngren classified meetings into these categories primarily on the basis of meeting length, group size, and the medium in which the meeting was conducted, e.g., face-to-face or by telephone. His rather limited classification criteria could be applied with a minimum of behavioral or meeting-content data. Based as it is on such a limited empirical foundation, the Thorngren scheme provides essentially nothing by way of detailed descriptions of meetings.

One of the few research methodologies that can be used to record actual meeting behaviors is Bales' "Interaction Process Analysis" (Bales, 1950). Bales developed behavioral profiles of meetings by classifying participant interactions into one of twelve categories, e.g., shows solidarity, gives or requests opinion, disagrees, or shows antagonism. These profiles have been used to test theories of the effect of leadership on problem solving, to relate behavior in meetings to managerial competence, and to provide a better understanding of the fundamental social processes occurring in meetings. Like most social-psychological research, however, the Bales technique emphasizes social processes--interactions that make up only a part of what actually happens at meetings. It does not provide a complete picture of the meeting process.

Information that is potentially more useful has come from meeting participants themselves. In a field survey of meeting participants, Snyder (1972) had 3000 Bell Laboratories employees complete a questionnaire in which they were asked to describe meetings they recently attended. In similar studies, Reid (1971) and Connell (1974) analyzed replies from over 6000 civil servants and from 500 office employees, respectively. Kollen and Garwood (1974) analyzed over 9000 survey returns in an enormous study of Canadian travellers going to and from meetings. In each of these studies, the respondents were asked specifically about face-to-face meetings in which they had been or would be participants.

The data collected in these field studies represent most of what is known about what happens in face-to-face meetings. Unfortunately, because the data were collected with questionnaires completed by the meeting participants themselves, the researchers had to depend on the accuracy of the respondents' recall of such factual data as the length of the meeting, the number of people who attended, and the number of audio-visual aids that had been used. To assume that the data provided by the participants are completely or even reasonably accurate is questionable in view of other findings that self-report estimates of the frequency or duration of even such simple events as telephone calls can be very inaccurate (Hartley, Brecht, Pagerey, Weeks, Chapanis, & Hoecker, 1977; Klemmer & Snyder, 1972). Still, these surveys provide some of the very few normative data available about face-to-face meetings.

In another study of meeting participants known as the DACOM study (Description and Classification of Meetings), Pye and his colleagues in the Communications Studies Group, attempted to describe and classify meetings in terms of functions, activities, and atmospheres (Pye, Champness, Collins, & Connell, 1973). The objective of the study was to identify types of face-to-face meetings that could just as well be held as teleconferences. Meeting-goers sampled from the greater-London business community were asked to select from lists of descriptive statements those that described a series of recent meetings they had attended. Meeting factors were obtained from a factor analysis of the responses. A classification scheme to differentiate distinct types of meetings was then developed by cluster analyzing the factors. The Communications Studies Group maintained that on the basis of the classification scheme specific communication characteristics of meetings could be determined if meeting functions, activities, and atmosphere were known. Indeed, in a subsequent study by Connell (1974), the classification scheme was used successfully to describe a much larger and more representative sample of 1791 face-to-face meetings and to make tentative decisions about whether those meetings could be teleconferenced.

Several methodological flaws, however, undermine the overall usefulness of the DACOM classification scheme. The analysis was based on respondent-generated evaluations of what meetings were like and so is subject to the previously mentioned limitations of all self-report studies. More seriously, the lists of functions, activities, and atmospheres (The last, incidentally, proved useless in classification and was eliminated.) were developed from open-ended respondent suggestions and as a consequence exhibit a considerable amount of internal redundancy. This redundancy resulted in the identification of many meeting types that differed in only trivial ways. The same functions and activities were used to identify different clusters with such regularity that meaningful or practical differences between meeting types were not always apparent.

In summary, there are two major problems with the studies reviewed here. First, the laboratory studies have little to say about real-world meetings. Second, the field studies base their conclusions about face-to-face meetings on data reported by meeting participants themselves. Because the accuracy of such data is suspect, the conclusions must be also. None of the studies provide objective, descriptive information of the kind that is necessary for an adequate understanding of meetings and the communication requirements in those meetings.

Statement of Purpose

The primary purpose of this study was to collect detailed, descriptive data about meetings in three different environments: academe, business, and government. The data document:

- how and why the meetings were conducted;
- when, where, and for how long the meetings were held;
- what the pattern and nature of communication interactions were among participants; and
- what use was made of supplemental communication aids such as audio-visuals and graphics.

The data were then analyzed to identify similarities and differences among the three kinds of meetings, to describe the communication requirements of these meetings, and to provide a set of normative information pertinent to the design of teleconferencing systems.

Method

For this study, meetings were defined as planned face-to-face encounters between two or more individuals who met for some specific non-social reason. In other words, chance encounters or strictly social interactions were not considered meetings in this context.

Meeting Selection

The meetings were selected equally from each of three environments: academe, business, and government. These particular groups of meetings were chosen because they: (a) intuitively appear to differ in many respects, (b) are numerous, (c) are readily accessible, and (d) are often regarded as suitable candidates for teleconferencing.

Selection criteria. A list of criteria was used to select meetings for observation. The criteria, shown in Table 1, defined the kinds of meetings that would be observed and established priorities for their selection. The sample of meetings conforms quite closely to these selection guidelines.

Nature of sample. In all, 51 meetings were observed. Three turned out later not to meet the selection criteria and were eliminated from further consideration. Of the remaining 48 meetings, 16 each were academic, business, and government. The brief descriptions in Table 2 give some indication of the nature and diversity of these meetings.

Period of data collection. Meetings from each group were observed throughout the period 24 June 1977 to 9 December 1977. If there were seasonal variations in the nature of meetings, as seems particularly likely with academic meetings, the relatively long period of observation at least provided an opportunity for different kinds of meetings to be sampled.

Data Collection Measures

Four data collection instruments were used:

- 1) a "Meeting as a Whole" record sheet for recording general descriptive information about the meeting.

Table 1
Criteria for Meeting Selection

Definition: Meetings are defined as planned face-to-face encounters between two or more individuals who are meeting for some specific purpose. Chance encounters or strictly social interactions are not considered meetings and are not to be observed.

Selection guidelines:

1. Only academic, business, and government meetings are to be observed. Group classification is based on the affiliation of participants unless the group is mixed, e.g., meeting of government and business officials, then classification is based on the affiliation of the person contacted for permission to attend the meeting.
 2. Equal numbers of academic, business, and government meetings are to be observed.
 3. Both public (unrestricted access) and private, non-public meetings are to be observed, preferably in nearly equal numbers.
 4. Priority is to be given to meetings that might feasibly be teleconferenced.
 - a) scheduled, formal meetings
 - b) meetings with limited numbers of participants
 - c) inter-department or multi-organization meetings.
 5. Similar types of meetings are to be observed for each group, i.e., meetings should be sampled from organizations of similar size, function, organizational structure, etc.
 6. A variety of meetings within each group is to be observed:
 - a) the same meeting is not to be observed more than once, i.e., no replication
 - b) meetings are to be selected from several different organizations instead of from only one
 - c) meetings are to be selected from different levels of management or organization hierarchy, e.g., production worker meetings as well as executive board meetings.
 7. Meetings from each group are to be observed throughout the data collection period, e.g., all the academic meetings are not to be observed first, followed by all the business meetings, etc.
 8. Meetings must be observed in their entirety, from beginning to end.
-

Table 2
Brief Descriptions of the 48 Academic,
Business, and Government Meetings

Description codes

A1, A2,...G16 = Meeting identification number
 P = Public meeting, open to all
 X = Private meeting, closed to general public
 R = Routine or regularly scheduled meeting, e.g.,
 weekly, monthly, or quarterly
 S = Scheduled one-time meeting arranged in advance
 I = Impromptu meeting, not scheduled in advance
 13:00 = Scheduled starting time
 13:02 = Actual starting time

Academic meetings

- A1 X, I, 16:32, 16:32
 Meeting between university advisor on sponsored research and
 faculty researcher to verify that a research proposal was correctly
 and completely prepared prior to submission.
- A2 X, R, 9:30, 9:34
 Meeting of executive committee of university library composed of
 head librarian and library department heads to review and coordinate
 various library activities.
- A3 X, S, 14:00, 14:03
 Meeting of university head librarian with salesman to discuss
 possibility of updating journal holdings with microfilm copies.
- A4 X, R, 15:00, 15:05
 Meeting of library "collection development" representatives from
 various university departments to discuss and review activities
 relating to library acquisitions.
- A5 X, S, 9:00, 9:02
 Meeting of the president and administrative staff of a small pri-
 vate college to review activities of each staff member.
- A6 X, I, 14:13, 14:13
 Meeting between university professor and graduate student to
 review progress on dissertation research.
-

Table 2 (continued)

-
- A7 X, S, 10:30, 10:37
Meeting of university provost officer and chairmen of various research review boards to discuss ways to streamline approval process.
- A8 X, S, 15:00, 15:09
Meeting of university diving safety board to critique draft of proposed safety guidelines for conducting research involving diving.
- A9 X, R, 15:00, 15:20
Meeting of the faculty of a state university department of psychology to discuss and vote on departmental business.
- A10 X, S, 15:00, 15:12
Meeting of state university course-coordinating committee to plan and review undergraduate psychology course offerings.
- A11 X, R, 9:30, 9:41
Meeting of university dean of students and his staff to review each staff member's progress.
- A12 X, I, 10:54, 10:54
Meeting between university dean of students and staff member following previous meeting (A11) to advise staff member on course of action.
- A13 X, R, 16:00, 16:11
Meeting of university committee on undergraduate studies to discuss issues relating to undergraduate studies.
- A14 X, S, 15:00, 15:06
Meeting of college department of philosophy faculty to discuss library acquisitions procedures with a representative of the library.
- A15 X, R, 10:30, 10:37
Meeting of university quantitative psychology research seminar, composed of faculty and students, to discuss and critique on-going research.
- A16 X, R, 11:00, 11:01
Meeting of university undergraduate psychology class.
-

Business meetings

- B1 P, R, 19:30, 19:45
Meeting of local businessmen's association to learn of proposed urban renewal plan being presented by city officials.
-

Table 2 (continued)

-
- B2 X, S, 8:45, 9:51
Meeting between public relations director of large food condiments corporation and investment consultant/salesman to discuss placing corporate advertising in financial digest.
- B3 X, I, 10:25, 10:25
Meeting between public relations director of large food condiments corporation and staff associate to authorize a project.
- B4 X, I, 10:51, 10:51
Meeting between public relations director of a large food condiments corporation and staff associate (different than in B3) to assign duties to associate.
- B5 X, I, 15:11, 15:11
Meeting between public relations director of large food condiments corporation and staff associate (different than in B3 or B4) to clarify details of memo being prepared.
- B6 X, S, 16:00, 16:01
Meeting of public relations director of large food condiments corporation, an associate, and state chamber of commerce representatives to plan and coordinate a banquet honoring county official.
- B7 X, S, 10:00, 10:13
Meeting of management and staff of large paper carton and packaging corporation and regional sales representatives to allow interaction and feedback.
- B8 X, S, 13:30, 13:40
Meeting of elected representatives of production workers at a large paper carton and packaging corporation and regional sales representatives to allow interaction and feedback.
- B9 X, R, 9:00, 9:13
Meeting of quality control and product reliability group of large electronics corporation to review production scheduling and problems in assembly of electronic test equipment.
- B10 X, S, 9:30, 9:37
Meeting of telephone company administrative services representatives with contractors to coordinate completion of cafeteria construction.
- B11 X, R, 2:00, 2:09
Meeting of employee advisory committee at moderate-sized press (book and magazine printer) to advise management on use of plant facilities.
-

Table 2 (continued)

-
- B12 X, R, 9:30, 9:34
Meeting of telephone company records management representatives to discuss and coordinate the management of corporate records.
- B13 X, R, 13:00, 13:05
Meeting of project director and department heads at large electronics corporation to discuss and coordinate project completion.
- B14 X, S, 9:30, 9:30
Meeting of regional telephone company engineers to discuss data collection and record keeping procedure for new management review program.
- B15 X, R, 14:30, 14:37
Meeting of employee fire and safety committee of large electronics corporation to discuss fire and plant safety issues and procedures.
- B16 X, R, 13:00, 13:03
Meeting of head of engineering department and staff at large electronics corporation to review project progress and problems.
-

Government meetings

- G1 X, S, 14:00, 14:13
Meeting of federal agency representatives and independent program administrator to evaluate program needs.
- G2 P, R, 13:00, 13:05
Meeting of county liquor board to hear arguments and rule on the granting of liquor licenses.
- G3 P, R, 11:00, 11:07
Press conference of county executive.
- G4 X, S, 14:00, 14:06
Meeting of county department of health administrative staff to discuss hiring procedures.
- G5 P, R, 15:30, 15:34
Meeting of county board of parks and recreation to review progress of committee and board members.
- G6 P, R, 14:00, 14:05
Work session of county council to discuss and hear arguments related to topics and bills to be introduced at next regular council session.
-

Table 2 (continued)

-
- G7 P, R, 10:00, 10:12
Meeting of county executive board to review activities of department heads.
- G8 P, I, 10:53, 10:53
Meeting of selected county executive board members to resolve issue arising in previous meeting (G7).
- G9 X, S, 10:15, 10:57
Meeting of U.S. Postal Service research staff with contractor to clarify research objectives and present progress report.
- G10 P, R, 9:00, 9:04
Meeting of state advisory committee to discuss feasible power plant sites within the state.
- G11 P, R, 14:00, 14:14
Meeting of state advisory commission on aging to discuss and hear arguments related to disposition of funds for senior citizens.
- G12 P, S, 9:30, 9:37
Meeting of city planning and coordination representatives with representatives of a local corporation to discuss mutual problems and progress made to alleviate those problems.
- G13 P, S, 10:30, 10:52
Meeting of city mayor and urban project committee to critique and edit draft of project policy statement.
- G14 P, I, 11:49, 11:49
Meeting of city planning and coordination staff and selected city agency heads to further discuss editing and revision of project policy statement considered in previous meeting (G13).
- G15 P, R, 8:30, 9:55
Meeting of county board of health to discuss and rule on county health issues.
- G16 P, S, 14:30, 14:34
Meeting of state office of aging directors with nursing home association representatives to discuss and up-date topics of mutual interest.
-

- 2) a behavioral coding scheme for recording participant interactions and selected meeting events,
- 3) a "supplemental communication aid" information card for recording the use of audio-visual aids, and
- 4) a participant questionnaire for eliciting non-observable information about the meeting.

"Meeting as a Whole" record sheet. Figure 1 shows a sheet of this type completed for a typical meeting. Note that among other things, the following items of information were collected: the time and location of the meeting; the purpose of the meeting; the number, role, and status of meeting participants; and the number and disposition of topics discussed at the meeting. The observer also made a sketch of the layout of the meeting room to show the seating arrangement of participants and the location of available communication aids such as blackboards, flipcharts, and telephones.

Behavioral coding scheme. Communication interactions, that is, the flow and nature of communication within the meeting, and other closely-related meeting activities were observed and recorded by systematic activity sampling (Chapanis, 1959, pp. 26-36). Fixed-interval sampling was used with observations made every 30 seconds. In pilot tests, a 30-second interval was determined to be a reasonable compromise between sampling adequacy and observer workload. A detailed description of the behavioral coding scheme, including definitions of the behaviors and activities recorded, is given in Appendix A. The Observation Coding Sheet used to record this information is shown in Figure 2.

The coding scheme was pilot tested in ten different meetings prior to its use in this study. In seven of those meetings, pairs of three observers (two observers per meeting) independently recorded activities in the same meeting. Coefficients of agreement (Robinson, 1957) between the data collected by the two observers were calculated for each activity category; e.g., speaker, addressee, and topics, in each meeting. The coefficients, which can range from 0 to 1 where 1 indicates perfect agreement, were averaged for the three observer pairs and for the seven meetings. Average agreement coefficients for the three pairings of observers were almost identical: .89, .91, and .92. Average coefficients of agreement for the nine activity categories ranged from .67 for "Topics" to .99 for "# of On-going Conversations" and "Availability" with an overall average of .90.

Definitions of behaviors in categories where agreement was low in the pilot tests, e.g., "Direction" and "Topics," were refined to reduce coding ambiguities. The definitions in Appendix A are the revised versions. In this study, all meetings were observed by the same observer using the revised coding scheme.

MEETING AS A WHOLE RECORD SHEET

Meeting ID#: B 13 Date: 9/26/77

Meeting/Group Name: ** deleted to ensure confidentiality **

Location of Meeting: Conference Room, Bldg 21

Scheduled Start Time: 1:00 PM Actual Start Time: 1:05+

Type of Meeting: Program Review

Purpose of Meeting: To discuss & coordinate project progress

Participant/Number Composition by Status:

1. <u>Project Head</u>	6. <u>Dept. Rep.</u>	11. _____
2. <u>Dept. Rep.</u>	7. <u>Dept. Rep.</u>	12. _____
3. <u>Materials Control</u>	8. <u>Staff Member</u>	13. _____
4. <u>Project Eng. Hwa</u>	9. _____	14. _____
5. <u>Head of Drawings</u>	10. _____	15. _____

Number of Participants: 8

Number of Official Group Members: 7

Number of People Absent: ?

Number of People Who Entered During the Meeting: 3

Number of People Who Left During the Meeting: 2

Number of Times Additional, External Information Was Requested: ?

Number of Topics Dealt With: 1

Number of Topics Not Resolved or Carried Over to Next Meeting: 0

Diagram of meeting room, noting seating arrangement of participants (by ID# and status) and the location of available supplemental communication aids:

(front)

(back)

Figure 1. "Meeting as a Whole" Record Sheet

Group Configuration

OBSERVATION SHEET

Grp #: B13

Date: 9/26/77

Page: 1 Observer: [Signature]

Observer 1

Table

TIME	# of On-going Interactions	Speaker	Addressee	Direction	Availability	Nature	Medium	Topic #	Change in Location	COMMENTS
1:00	I-A N X O	PH	PH A	P D	P X	FQRC	OMGPR	#	PH	
01										
+										
02										
+										
03										
+										
04										
+										
05										START MEETING
+	1	1	A	D	P	F	O	1		Topic #1 - discussion
06	1	1	2	D	P	F	O	1		of "action item" from
+	1	1	2	D	P	F	O	1		previous meeting which
07	1	1	4	D	P	F	O	1		needs clarification
+	1	1	4	D	P	F	O	1		
08	1	1	4	D	P	F	O	1	5	#5 enters room
+	1	1	4		P	Q	O	1		
09	1	1	4	D	P	C	O	1		#1 = Group leader
+	1	1	4	D	P	C	O	1		
10	1	1	4	D	P	F	O	1		
+	2	1	4	D	P	F	O	1		Simultaneous Conv
11	1	4	2	D	P	F	O	1		2 to 3 Private
+	1	1	4	D	P	Q	O	1		
12	1	1	4	D	P	C	OG	1		Pointing to #4
+	1	1	2	D	P	F	O	1		
13	1	1	2	D	P	F	O	1		
+	1	1	4	D	P	F	O	1		Use of much electronic
14	1	1	2	D	P	C	O	1		large ISO orders,
+	1	1	2	D	P	C	O	1		interactive boards,
15	1	1	3	D	P	R	O	1		AOA's, PTP, GAM'd
+	1	1	3	D	P	R	O	1		

Figure 2. First of four sequential sides of the two-page Observation Coding Sheet. Minutes 1-15 were recorded on this side of the first page opposite the time intervals on the left margin; minutes 16-30 were recorded on the reverse side. Minutes 31-45 and 46-60 were recorded on the front and back, respectively, of the second page. (The data shown represent a portion of a typical meeting.)

Despite its complexity, the coding scheme was readily committed to memory and was quite easy to use. The observer had little difficulty in coding meeting activities. Less than one percent (.67%) of all observations were coded "X" due to his inability to make a judgment of what was happening.

Supplemental communication aid information card. A supplemental communication aid was defined as any material or device, for

SUPPLEMENTAL COMMUNICATION AID INFORMATION CARD	
Grp ID#:	Obs. Time: _____:_____:
AID:	<div> <div> Document Handwritten Note Blackboard Chart, Poster, Schema Audio Recording </div> <div> Film Vu-graph, Opaque Proj. Slide Video (tape or live) Other _____ </div> </div>
Dist by:	Speaker <input type="checkbox"/> Chairman <input type="checkbox"/> Sec'y <input type="checkbox"/> Other _____
Dist to:	Speaker only <input type="checkbox"/> Some <input type="checkbox"/> All <input type="checkbox"/>
Preparation:	Prepared <input type="checkbox"/> On-the-Spot <input type="checkbox"/>
Content:	Text ____% + Stat ____% + Graphic ____% + Pict ____% = 100%
Use:	Immediate <input type="checkbox"/> Future <input type="checkbox"/>
Purpose:	Information <input type="checkbox"/> Action <input type="checkbox"/>
Description:	_____
Comments/Problems Encountered, etc.:	_____

Figure 3. Supplemental Communication Aid Information Card

example, a document, xerox facsimile, chart, blackboard, or slide presentation, that facilitates the communication of information. The use of these aids was recorded on a "Supplemental Communication Aid Information Card" like the one shown in Figure 3. A detailed description of the information recorded is given in Appendix B.

Participant questionnaire. Not all the information of interest could be obtained by observation. Some of this non-observable information was elicited by a brief questionnaire (Appendix C) that pertained only to the meeting that had been observed. Fifteen of the

18 questions requested information available only from the participants themselves. For example, participants were asked "how much advance notice they had of the meeting" (Question 1), "how far they had to travel to attend" (Question 2), and "how effective the meeting had been" (Question 15).

The remaining three questions (4, 6, and 8) requested information about aspects of the meeting that had already been documented by the observer, for example, "had the meeting started on time," "was there a chairman," and "were certain audio-visual aids used." Participant responses to these questions were subsequently compared with observed data to provide some indication of the confidence that might be placed in the accuracy of the self-report information.

Procedure

Data collection required that the observer be admitted to the meeting and a great deal of effort had to be devoted to that end.

Access to meetings. Two methods were used to find out when meetings were scheduled and to gain access to those meetings. One procedure was to identify meetings from schedules and calendars of events that listed when and where particular meetings were to be held. Such schedules were available in local newspapers and in intra-organization bulletins. The person in charge of a meeting that met the selection criteria was contacted and asked if the observer could attend and observe the meeting. This technique worked particularly well for government meetings because so-called "sunshine laws" require government meetings to be announced and open to the public.

Because this procedure tends to be biased against non-public, informal, and less routine meetings, another method was used to gain access to some meetings. In this technique, called the "tag-along" method, a representative of one of the three groups (often a colleague, friend, or someone referred by a friend) was contacted and asked for permission to allow the observer to accompany him (tag along) to any meetings he might attend during the day. The observer then observed any of these meetings that satisfied the selection criteria. The tag-along method allowed the observer to attend meetings he might not otherwise have known about and also gave him access to meetings that probably would have been inaccessible to the observer without the support or endorsement of the person he was accompanying.

Preliminaries to observation. Irrespective of the mode of access, the person contacted for permission to attend, the meeting contact person, was apprised of the purpose and nature of the research project. Assurances were given that the observation would not disrupt the meeting any more than absolutely necessary, that the anonymity of participants and confidentiality of meeting content would be strictly guarded, and that the observer could be asked to leave the meeting at any time. The last never occurred.

In the majority of cases, the contact person introduced the observer to the participants just prior to the start of the meeting and explained why the observer wanted to attend. The above assurances were then given to the participants both verbally and in a cover letter that explained the research and asked for their cooperation. In compliance with procedures outlined by the University Review Board on the Use of Human Subjects, a signed informed-consent form was obtained from the person responsible for the meeting on behalf of all the participants at non-public meetings. Although the Review Board did not require informed-consent forms at public meetings, permission to observe was sought from the person in charge whenever possible. Copies of the cover letter and informed-consent form are shown in Appendix D.

Due to practical constraints, the person in charge of a meeting often deviated from the procedures just described. For example, in some meetings the observer was asked to explain his research to the participants and to request their permission to attend the meeting. At other meetings the contact person assumed total responsibility for the members and did not introduce the observer until after the meeting. In one instance, the chairman flatly refused to sign the informed-consent form. He maintained that his verbal consent was adequate and that the informed-consent form was a bureaucratic nuisance.

Despite these unavoidable inconsistencies, their effect is considered to be minor. There seemed to be a clear demarcation between the introduction of the observer and the meeting itself. Once the observer was introduced and permission given to attend (There were no refusals.), all meetings appeared to proceed normally, uninterrupted by the observer or the observation process. Invitations to join the participants at the meeting table were declined whenever they were made and participants were discouraged from explaining what was happening as the meeting progressed. Instead, the observer sat off to the side, out of the way, so as to be as unobtrusive as possible, and observed the meeting, recording what went on from beginning to end.

Participant comments about "forgetting the observer was present because he was so quiet" and "failing to understand how the observer could observe the meeting without asking questions about what was going on" attest to the apparent success of these efforts to interfere as little as possible. Participant responses to a questionnaire item about the disruptiveness of the observer's presence also indicated the observer interfered very little. Although some interference was inevitable, the magnitude of its effect on the data is probably small.

"Meeting as a Whole" data. These data were collected by the observer from a variety of sources. Some information was available prior to the meeting based on examination of the meeting site and on participant responses to observer questions. In particular, the contact person served as a valuable and knowledgeable source of

information about the meeting and often provided the observer with information about the meeting's purpose, its schedule, and the role of various participants. Other information was compiled during observation by means of special tallies or from other data collection measures.

Behavioral coding scheme data. Just prior to each meeting, the observer entered the required identifying information on the Observation Coding Sheet (Figure 2) and sketched the layout of the meeting place, including the positions of participants and apparatus, e.g., displays, microphones, and podiums, at the top of each coding sheet. This information was updated on subsequent coding sheets if, for example, participants changed seats or new participants arrived.

When the meeting started, the observer noted the starting time, selected the side of the coding sheet for that quarter hour, found the line on the coding sheet corresponding to the first 30-second observation time following the meeting's actual starting time, and began to record data. At that and each subsequent moment of observation, the observer recorded the meeting activities by marking the appropriate alpha-numeric code under each of the nine information categories appearing across the top of the observation sheet. As a recording convenience, ditto marks were used to re-enter codes that remained unchanged from previous observations. Comments were entered to clarify or elaborate any situation or event for which the coding scheme was inadequate or inappropriate.

Supplemental communication aid data. The observer completed a Supplemental Communication Aid Information Card (Figure 3) each time a different supplemental communication aid was used during a meeting, whether or not that use coincided with a time of observation. A description of the aid and its use was recorded on the card by checking or writing the appropriate responses as described in Appendix B. In some cases, it was necessary to complete the card over an extended period of time as amplifying information became evident from continued observation. The first observation time following the aid's initial use was recorded on the card to serve as a cross-reference to activities occurring during the meeting. Regardless of how many times or how long a particular aid was used during a meeting, its use was recorded only once. Slide and film presentations were counted as single aids regardless of the number of slides or frames viewed.

Participant questionnaire. In the first few meetings, the questionnaire and cover letter were both distributed to participants before the meeting. This had a disruptive effect because participants often began completing the questionnaire during the meeting despite instructions to the contrary. Consequently, in most of the meetings, the questionnaires were distributed at the conclusion of the meeting. Participants were asked to complete the questionnaire immediately and to return it to the observer when they had finished. In special circumstances, participants were given the option of returning the

questionnaire later in a pre-addressed, stamped envelope. This option accommodated those participants who had to leave early or who were too rushed to complete the questionnaire at the conclusion of the meeting.

For several reasons, it was not possible to distribute the questionnaire to all participants in all meetings. For example, it was impractical to distribute the questionnaire to participants in some large public meetings. In those circumstances, it was sometimes possible to distribute questionnaires to selected participants, usually to those who had been most active in the meeting. Occasionally, the questionnaire was not distributed at all because the time required to complete the questionnaire, about five minutes, was deemed unreasonable in light of other considerations. For example, permission to observe one meeting had been granted so reluctantly that the further imposition of a questionnaire was not considered appropriate. Finally, the person in charge of the meeting sometimes refused to allow the questionnaire to be distributed.

The questionnaire was by far the most threatening of the several data collection measures, and participants were often concerned about the use that would be made of the questionnaire and about the time required to complete it. Common complaints were, "We are constantly getting barraged by questionnaires, some of which take hours to complete," "Is this really necessary?" or "I wasn't really a member of this group. Do I have to fill one out?"

Results

Table 3 lists and defines 68 dependent variables that summarize most of the descriptive data collected for each meeting. The variables MTGTIME, DELAY, and those with an "N" prefix are raw data variables, e.g., times or frequencies; those with a "P" prefix are proportions based on the raw data variables. Descriptive statistics for all the variables except PGESTURE, which was never observed, are presented in Appendix E. Statistics are presented separately for academic, business, and government meetings, and for all meetings combined. For some variables, DELAY for example, two sets of statistics are provided. The first set applies to the data for all meetings; the second to the data for only those meetings in which the variable was actually observed, i.e., meetings with zero values for that variable are not included. In all cases, N shows the number of meetings on which statistics are computed. Due to the extreme skewness of the distributions of data for some of the variables, two measures of central tendency, the arithmetic mean and the median, are given. Also included are the standard deviation, skewness defined as

$$\frac{\sum (X - \bar{X})^3}{N_s^3}, \text{ kurtosis defined as } \frac{\sum (X - \bar{X})^4}{N_s^4} - 3, \text{ and the smallest and largest}$$

data values.

General Meeting Characteristics

This section describes certain general characteristics of the meetings observed. These characterizations are based in part on data collected with some of the variables in Table 3 and in part on the "Meeting as a Whole" observations (p. 13).

Meeting site. Table 4 shows that meetings occurred in a variety of settings. Exactly half of the meetings were conducted in conference rooms; a third in private offices; and the remainder in classrooms, training rooms, and multipurpose rooms.

As compared with the British DACOM study (Pye, et al., 1973), a much larger percentage of meetings in this study, 50 percent versus 24 percent, were conducted in conference rooms while a somewhat smaller percentage, 33 percent versus 40 percent, were conducted in

Table 3

Sixty-eight of the Dependent Variables Studied

Variable Name	Variable Description
DELAY	Delay in the start of the meeting, i.e., difference between scheduled and actual starting times
MTGTIME	Length of meeting in minutes
NPRES	Number of people present at some time during the meeting
NPART	Number of people actively participating in the meeting, i.e., number of people who spoke or otherwise communicated, were addressed individually, or changed locations
PCTMT	Proportion of total meeting time (MTGTIME) spent communicating, e.g., time spent speaking or interacting
PCT 1	Proportion of communication time (defined as all time spent communicating) during which there was only one communication interaction occurring, i.e., there was only one active communicator speaking or interacting
PCT 2	Proportion of communication time during which two distinct communication interactions were occurring simultaneously
PCT 3	Proportion of communication time during which three distinct communication interactions were occurring simultaneously
PCT 4	Proportion of communication time during which four distinct communication interactions were occurring simultaneously
PCT 5	Proportion of communication time during which five distinct communication interactions were occurring simultaneously
PCTALL	Proportion of communication time during which more than five distinct communication interactions were occurring simultaneously or during which all or most participants were talking or interacting at the same time

Table 3 (continued)

Variable Name	Variable Description
NSIM	Number of simultaneous communication interactions
PSIM	Proportion of total communication time that was simultaneous communication interaction, i.e., the sum of PCT 2, 3, 4, 5, and PCTALL
PMTNCOM	Proportion of total meeting time (MTGTIME) during which there was no communication interaction, e.g., silence due to transition from one speaker or topic to another
PMTOTH	Proportion of total meeting time (MTGTIME) during which activities other than communication interactions, e.g., voting or coffee breaks, were occurring
PMTNOBS	Proportion of total meeting time (MTGTIME) during which the observer was unable to code meeting activity, i.e., no observation was made
NSPEAKER	Number of participants who communicated or interacted during the meeting
NSP 25	Number of participants who communicated less than or equal to 25% of the communication time
PSP 25	Proportion of participants who communicated less than or equal to 25% of the communication time
NSP 50	Number of participants who communicated more than 25% but less than or equal to 50% of the communication time
PSP 50	Proportion of participants who communicated more than 25% but less than or equal to 50% of the communication time
NSP 75	Number of participants who communicated more than 50% but less than or equal to 75% of the communication time
PSP 75	Proportion of participants who communicated more than 50% but less than or equal to 75% of the communication time

Table 3 (continued)

Variable Name	Variable Description
NSP 100	Number of participants who communicated more than 75% of the communication time
PSP 100	Proportion of participants who communicated more than 75% of the communication time
NADD	Number of participants who were addressed individually during meeting
NAD 25	Number of participants who were addressed individually less than or equal to 25% of the communication time
PAD 25	Proportion of participants who were addressed individually less than or equal to 25% of the communication time
NAD 50	Number of participants who were addressed individually more than 25% but less than or equal to 50% of the communication time
PAD 50	Proportion of participants who were addressed individually more than 25% but less than 50% of the communication time
NAD 75	Number of participants who were addressed individually more than 50% but less than or equal to 75% of the communication time
PAD 75	Proportion of participants who were addressed individually more than 50% but less than 75% of the communication time
NAD 100	Number of participants who were addressed individually more than 75% of the communication time
PAD 100	Proportion of participants who were addressed individually more than 75% of the communication time
PALLAD	Proportion of communication time during which all the participants were addressed as a whole
PCHSP	Proportion of communication time during which the chairman or leader communicated during the meeting

Table 3 (continued)

Variable Name	Variable Description
PCHAD	Proportion of communication time during which the chairman or leader was addressed individually during the meeting
PDISCUSS	Proportion of communication time during which there was interactive discussion among the participants
PPRESENT	Proportion of communication time during which a uni-directional presentation was addressed to the group of participants
PPUBLIC	Proportion of communication time during which communication interactions were public and available to all participants
PPRIVATE	Proportion of communication time during which communication interactions were private and directed exclusively to specific participants
PFACTUAL	Proportion of communication time devoted to factual statements or interactions
PQUEST	Proportion of communication time devoted to questions
PRESP	Proportion of communication time devoted to responses to questions
PCONTROL	Proportion of communication time devoted to control statements, e.g., imperatives and directives
PSOCIAL	Proportion of communication time devoted to social statements
PORAL	Proportion of communication time during which communication interactions were exclusively oral
PWITTEN	Proportion of communication time during which communication interactions were exclusively written

Table 3 (continued)

Variable Name	Variable Description
PPHYS	Proportion of communication time during which communication interactions involved physical contact between participants or the transfer of an object from one participant to another
PGESTURE	Proportion of communication time during which communication interactions were exclusively gestural
POW	Proportion of communication time during which communication interactions were a combination of PORAL and PWRITTEN
POP	Proportion of communication time during which communication interactions were a combination of PORAL and PPHYS
POG	Proportion of communication time during which communication interactions were a combination of PORAL and PGESTURE
POR	Proportion of communication time during which communication interactions were read orally and verbatim from text
NTOPIC	Number of topics discussed during the meeting
NTOP 25	Number of topics discussed less than or equal to 25% of the communication time
PTOP 25	Proportion of topics discussed less than or equal to 25% of the communication time
NTOP 50	Number of topics discussed more than 25% but less than or equal to 50% of the communication time
PTOP 50	Proportion of topics discussed more than 25% but less than or equal to 50% of the communication time
NTOP 75	Number of topics discussed more than 50% but less than or equal to 75% of the communication time
PTOP 75	Proportion of topics discussed more than 50% but less than or equal to 75% of the communication time

Table 3 (continued)

Variable Name	Variable Description
NTOP 100	Number of topics discussed more than 75% of the communication time
PTOP 100	Proportion of topics discussed more than 75% of the communication time
NCHANGE	Number of times participants changed location, i.e., moved around, during the meeting
NPERCHG	Number of persons changing location during the meeting
NENT	Number of times participants entered the meeting area during the meeting
NLEFT	Number of times participants left the meeting area during the meeting
NAIDS	Number of supplemental communication aids used during the meeting

Table 4

Numbers and Percentages of Meetings Held
in Various Settings

Setting	Academic		Business		Government		All meetings	
	N	%	N	%	N	%	N	%
Conference room	4	25.00	7	43.75	13	81.25	24	50.00
Office	7	43.75	6	37.50	3	18.75	16	33.33
Classroom	4	25.00	0	.00	0	.00	4	8.33
Training room	0	.00	2	12.50	0	.00	2	4.17
Multi-purpose room	1	6.25	1	6.25	0	.00	2	4.17

offices. These differences are probably due to sampling errors in either or both of the studies. Which data are more accurate is impossible to determine.

Scheduled starting times for meetings. Scheduled and actual starting times for each meeting are given in Table 2. Meetings tended to be scheduled on the hour or half-hour. Notable exceptions were impromptu meetings that were not scheduled in advance and that took place at times convenient to the parties involved.

Scheduled starting times are plotted in Figure 4. Meetings were scheduled throughout the working day, but all distributions are clearly bi-modal. Most meetings were scheduled for either mid-morning or mid-afternoon, at 9:30 a.m. or at 2:00 and 3:00 p.m. Kolmogorov-Smirnov two-sample tests (Siegel, 1956) of the three possible pairwise comparisons of these distributions showed no significant differences among the academic, business, and government meetings.

Delay in the start of meetings. Although 40 meetings were planned in advance and scheduled to start at a definite time, only one actually did. By definition, the eight impromptu meetings started on time. Statistics for the variable DELAY are given in Appendix E for all 48 meetings and for just those 39 meetings in which there actually was a delay. When meetings were delayed, the delays varied widely--from as little as one minute to nearly an hour and a half (85 minutes). That extremely long delay occurred at one government meeting (G15) because a key member failed to arrive on time. The median delay for all meetings was six minutes or, for only those meetings that were delayed, seven minutes.

Because most teleconferencing systems represent a great capital investment, idle time or unused time, is expensive. The high probability (.98) that a meeting will not start on time could present a serious problem. There is no way of knowing whether such delays would be reduced or eliminated if people knew that a meeting were to be held as a teleconference, but failure to start on time is a pervasive feature of face-to-face meetings and one that must be considered in planning for teleconferences.

Length of meeting. Descriptive statistics for the variable MTGTIME (Appendix E) show that meetings varied greatly in length. Some lasted only two minutes while others were nearly five hours long. The median length was just over one hour, 66 minutes. Meeting lengths did not differ significantly among the three groups when tested by the Kolmogorov-Smirnov two-sample test (Siegel, 1956).

The durations of meetings in this study (Table 5 and below) are comparable to those in the DACOM study:

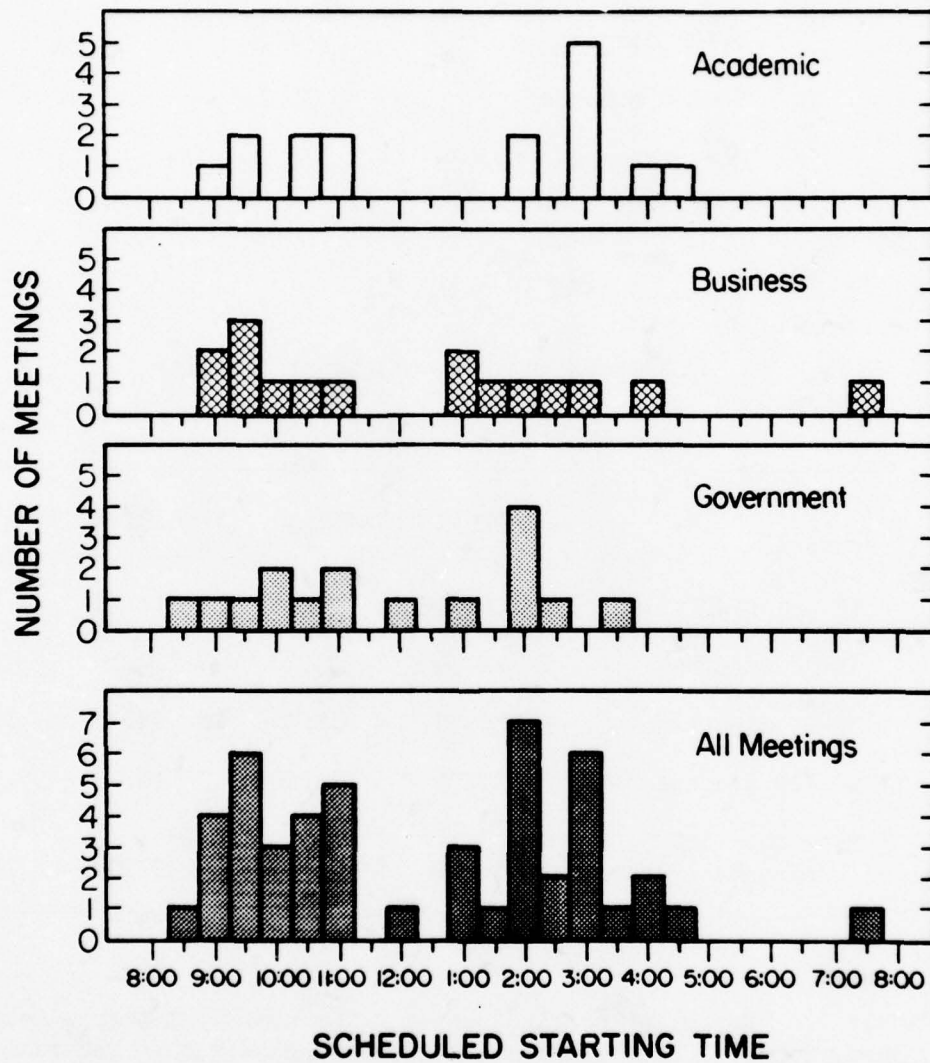


Figure 4. Scheduled starting times for the three groups of meetings and for all meetings together. (Data have been rounded to nearest hour or half hour.)

Duration	Percent of meetings	
	This study	DACOM
10 minutes or less	8.33	10.6
10-30 minutes	12.50	16.7
30-60 minutes	25.00	26.7
60-120 minutes	31.25	21.9
More than 120 minutes	22.92	24.1

Table 5
Numbers and Percentages of Meetings
of Various Durations

Duration	Academic		Business		Government		All meetings	
	N	%	N	%	N	%	N	%
10 minutes or less	1	6.25	1	6.25	2	12.50	4	8.33
10-30 minutes	2	12.50	2	12.50	2	12.50	6	12.50
30-60 minutes	5	31.25	4	25.00	3	18.75	12	25.00
60-120 minutes	8	50.00	4	25.00	3	18.75	15	31.25
More than 120 minutes	0	.00	5	31.25	6	37.50	11	22.92

Number of people present. The number of people attending meetings was highly variable (NPRES, Appendix E). The range was from two to 60, with a median of 8. In this connection, remember that by the definition of NPRES given in Table 3 individuals need not have participated in the meeting to be counted as present. To be included in the measure NPRES, it was sufficient that a person merely be present in the meeting area, whether or not he spoke or took an active role in the meeting.

Number of meeting participants. Although the median number of people who actively participated in the meeting, i.e., spoke, were

addressed, or changed locations, was also eight (NPART, Appendix E), the number of people participating was less variable than the number present. Six (12%) of the meetings were two-person meetings (compared to 36% in the DACOM study) and no more than 31 people participated in any one meeting. The lower proportion of two-person meetings in this study compared to the DACOM study may indicate a sampling bias in this study against small, informal meetings, or conversely, greater sensitivity of respondents in the DACOM study to smaller, in-office meetings which they described more frequently.

Leadership role in meetings. In every one of the 48 meetings there was at least one participant who took a leadership role in the meeting. These individuals were classified as either chairmen or leaders.

A chairman directed and controlled the meeting process. He could rule on issues and arbitrate decisions and his authority was final. Most important, he had an official capacity, a formal position, that had been gained by some established process. That is, he had been elected or appointed chairman and that role authorized his power within the group.

A leader also directed and controlled the meeting, but his ability to make decisions or to direct others arose from his status as the "boss," senior member, or most knowledgeable person in the group. That status resulted in his being accepted as leader, without any formal authorization. For example, in one meeting (A1) between a faculty member and a university administrator, the latter was the "leader" of the meeting because he was the source of authority and knowledge which the faculty member sought for advice and approval regarding a research proposal. The administrator could not have been considered the chairman because he was not officially designated such nor was the relationship between the two participants a permanent one as might have been if they constituted some committee. On the other hand, the county Board of Parks and Recreation meeting (G5) did have a person who officially presided over the meeting as the "Board Chairman."

Table 6 shows the number of meetings in which either a chairman or leader presided. Leaders were somewhat more common than chairmen, but a chi-square test for k-independent samples (Siegel, 1956) indicated that neither a chairman nor a leader was more likely to preside at meetings of a particular group. Note that in three meetings there was both a chairman and a leader. In one academic meeting (A4), for example, the committee chairman conducted the procedural aspects of the meeting (voting, progression of topics), while the leader, the head librarian, guided the discussion and provided feedback and comments from the administration's point of view.

Table 6
Numbers of Meetings at Which Either a Chairman,
Leader, or Both Presided

Group	Chairman	Leader	Both
Academic	6	9	1
Business	5	10	1
Government	8	7	1
All meetings	19	26	3

Configuration of the meeting site. Twenty-one percent of the meetings (Table 7), mostly the smaller, less formal ones, were conducted with participants seated on either side of or around an office desk. Forty-four percent were conducted with members seated around a larger, more centrally located table. The remaining 35 percent were conducted with members seated throughout the meeting room. This last configuration often included a central table, but because there were insufficient positions around the table, some members took seats elsewhere in the room. Large meetings in which participants were seated in rows of seats or benches facing a podium or speaker's platform, as was sometimes the case for government meetings, were classified in the last category.

Table 7 also indicates the availability of certain auxiliary facilities within the meeting area. Fifty-six percent of the meeting rooms had a telephone; 21 percent a blackboard; 10 percent an easel or similar stand for displaying flipcharts, maps, or graphs; 8 percent projection screens; and 8 percent podiums. The availability of these facilities does not mean they were actually used during the meeting, only that they could have been. Except for the telephone, few were used.

Requests for additional information. A record was kept of the number of times insufficient information was available to reach a decision or to take some action during a meeting. In 61 percent of the meetings there was no need expressed for additional information, and in an additional 10 percent of the meetings it was unclear whether additional information had been requested. In 19 percent of the meetings, however, information was specifically requested and some action

Table 7
Numbers and Percentages of Meetings with Particular
Seating Configurations and Facilities

Seating configuration	Academic	Business	Government	All meetings	
	N	N	N	N	%
Seated around office desk	5	5	0	10	21
Seated around table	7	6	8	21	44
Seated throughout a room which sometimes had a central table	4	5	8	17	35
<u>Facilities available</u>					
Telephone	8	12	7	27	56
Blackboard	6	3	1	10	21
Easel	0	2	1	4	8
Projection screen	1	2	1	4	8
Podium	0	2	2	4	8

was taken to obtain it. When that happened, numerous requests, on the order of half-a-dozen, were frequently made in the same meeting. In response to such requests, a participant often left the room to get the information, telephoned from the room to someone outside to get the information, or promised to provide the information at a later time. Occasionally, no action was taken and participants proceeded without the requested information. These findings seem to indicate that participants do not prepare themselves adequately for some meetings or that a substantial number of meetings generate unanticipated information needs.

Other "Meeting as a Whole" data. Not included among the general meeting characteristics are some categories of information that are potentially of interest but that were impossible to record with reasonable accuracy or consistency. These are:

- classification of meetings by "type," e.g., a budget, planning, or evaluation meeting (Types were often not obvious.)
- the status or role of participants (not possible to determine for many participants)
- number of official group members among all those present (often impossible to distinguish "official" members from others)
- number of topics that were not resolved at the meeting and that had to be delayed or carried over to a subsequent meeting (Except when a vote was taken, the disposition of an issue was not always clear.)

Nature of Communication Interactions

The findings discussed in this section are based on data obtained with the activity sampling technique. Those data are summarized by variable name in Appendix E.

Communication interactions and other meeting activities. Communication was the single most important activity in all meetings. About 93 percent of total meeting time on the average was devoted to communication interactions (PCTMT) and that proportion was almost identical for each of the three groups. Even for the meetings at the lowest end of the range, communication took up about 60 percent of the total meeting time. Of the time spent communicating, 92 percent consisted of single interactions or conversations, i.e., only one speaker was talking and no other conversations or interactions were occurring (PCT 1). When simultaneous interactions did occur, most often there were only two such overlapping communications (PCT 2). On the average, this happened only five percent of the time. Note, however, that government meetings had the greatest proportion of two simultaneous interactions both on the average (8%) and at the extreme (43%). Occurrences of three, four, and five simultaneous interactions were rare and on the average none accounted for more than one percent of the total communication time (PCT 3, PCT 4, PCT 5).

The entire group was involved in simultaneous conversations or interactions (PCTALL) less than one percent of the time, on the average. Although there were outbreaks of laughter after a humorous joke or occasional heated discussions in which everyone seemed to be talking at once, which, according to the definition in Appendix A, were recorded as simultaneous conversations, these were generally brief and accounted for little of the communication time. In no meeting did simultaneous interactions among all participants exceed four percent of communication time.

The variable PSIM, which combines PCT 2, 3, 4, 5, and PCTALL, indicates that, on the average, less than eight percent of communication time involved any type of simultaneous communication interactions. Considering only the 73 percent of meetings in which there were simultaneous conversations, the proportion of time in which there were two or more simultaneous interactions initiated by two or more persons increases to a little more than ten percent. Note that the data are highly skewed, however, and that in one government meeting (G14) almost half (43%) of all communication time consisted of simultaneous communications. Because that meeting lasted only eight minutes and involved six simultaneous conversations, this particular datum is atypical. Still, in the one meeting with the most simultaneous conversations (also a government meeting, G6, the county council work session with 31 participants), there were 24 separate instances of overlapping communication (NSIM) which accounted for 31 percent of the communication time.

Simultaneous communications were nearly as common in business meetings as in government meetings and accounted for a comparable proportion of communication time on the average (PSIM). In one business meeting (B1), in which a large number of people (NPRES = 50) were seated in an audience and talked freely among themselves during presentations by several speakers, 39 percent of the communication time involved simultaneous interactions. Academic meetings, on the other hand, were characterized by much less simultaneous conversation, either on the average (8%) or at the extreme (26%).

Only a small proportion of meeting time (2% on the average) was idle time, i.e., time when no one was speaking or otherwise interacting (PMTNCOM).

The proportion of meeting time spent in other activities such as voting, film presentations, and coffee and lunch breaks (PMTOTH) varied considerably from meeting to meeting (0% to 35%) but the average was quite small, only four percent. One reason for the skewness of this measure is that it includes some lengthy luncheon breaks that occurred in only a few meetings. It seemed appropriate to account for luncheon time in meetings that broke for lunch because interactions that took place during lunch were not totally unrelated to the business of the meeting. In fact, in all but one instance, the luncheon was catered in the same room in which the meeting was held. In those meetings, the lunch was a continuing and, in a certain sense, legitimate part of the meeting process. It is interesting to speculate how luncheons should be dealt with when teleconferences are scheduled among persons in widely-separated locations and in different time zones.

Another way of describing meeting time devoted to other activities is to look at its probability of occurrence and the statistics for only those meetings in which it occurred. Other activities

were observed in less than half (45.5%) of all meetings and accounted on the average for only eight percent of the meeting time.

As has already been stated in the section describing the behavioral coding scheme (p. 13), the observer was unable to classify and code observed meeting behaviors (PMTNOBS) only a very small fraction of the time, less than one percent, on the average. The one major exception, an academic faculty meeting (A9), involved so many people (32) and was so disorganized and so unruly that 19 percent of the meeting was lost to the observer because he could not see all the participants and had difficulty following the interactions.

Speakers.¹ The number of people who spoke or initiated interactions (whether oral, written, or otherwise) during a meeting (NSPEAKER) ranged from two to 31 and that number was closely related to the number of participants ($r = .86$). The average number of speakers was eight, the median number, seven. Most of those who spoke or initiated communication interactions during a meeting (on the average, 6.7 or 68%) did so no more than 25 percent of the time that was actually occupied with communication activities (NSP 25, PSP 25). An average of one (22%) of the speakers in a meeting communicated more than 25 percent but less than or equal to 50 percent (NSP 50, PSP 50), and a maximum of one person per meeting communicated more than 50 percent of the communication time (NSP 75, PSP 75, NSP 100, PSP 100). In all 48 meetings there were only 11 instances in which an individual spoke or communicated between 50 and 75 percent of the communication time and only four instances in which someone communicated more than 75 percent of the time. The last were meetings A16, B4, B15, and G3 and all except B4 were large gatherings of people who were assembled to hear someone give a lecture, a training demonstration, or a press conference.

If the arbitrary criterion of 50 percent of the communication time is taken as a threshold for dominance, a relatively small number of participants dominated the communication process in any given meeting. To arrive at that conclusion, the proportions of communication time attributed to each participant in a meeting were first rank ordered. The minimum number of proportions, beginning with the

¹Strictly speaking, the use of the word "speaker" to describe participants who initiated interactions is a misnomer because interactions were not necessarily oral or spoken. Participants could also interact and initiate communication by other means such as written notes or gestures. Still, because the vast majority of interactions were oral, speaker will on occasion be used in the following discussion for the sake of simplicity. The reader should keep in mind that the interaction was not necessarily oral and that the word speaker is used primarily to indicate that the communication originated with this person.

largest, that had to be summed to equal or exceed 50 percent represents, by the above definition, the number of participants who dominated the communication process in that meeting. Thus, if one participant spoke or otherwise transmitted information at least 50 percent of the time, the meeting was dominated by that one participant alone. If no one participant interacted at least 50 percent of the communication time, the smallest number of participants who together contributed 50 percent, or a value just in excess of 50 percent, of the interactions were said to dominate the meeting.

Table 8 shows the cumulative numbers and percentages of meetings dominated by increasing numbers of participants. For example, in 18 (37.5%) of the meetings a single participant dominated the communication interactions. In 56 percent of those meetings that participant was either the chairman or leader (not shown in table). Thirty-eight (79%) meetings were dominated by as few as two participants and 66 percent of the time the chairman or leader was one of the two. In every meeting five or fewer "speakers" dominated the communication process. These data are, of course, confounded with meeting size. For example, there were six (12%) two-person meetings in this sample. Because there were only two participants in those meetings, one of the two necessarily communicated at least 50 percent of the communication time and so dominated the meeting. Similarly, no more than two persons could have dominated the three 3-person meetings. Still, in general, a very few participants contributed most of the communication in the meetings observed.

Individual addressees. The number of people who were addressed individually at meetings (NADD) happened to be almost exactly the same as the number of "speakers." The range was from two to 31 and the mean, eight. Of those addressed individually, three quarters were addressed no more than 25 percent of the communication time (NAD 25, PAD 25); 18 percent were addressed more than 25 percent but not more than 50 percent (NAD 50, PAD 50); and no more than one person was addressed individually more than 50 percent of the communication time (NAD 75, PAD 75, NAD 100, PAD 100). There were only seven occurrences in 48 meetings in which an individual was addressed 50-75 percent of the communication time and only one instance (B4, a two-person meeting) in which someone was addressed more than 75 percent of the time.

Non-specific addressees. Not all interactions were addressed to individual group members. In fact, interactions were directed to group members as a whole (PALLAD) 29 percent of the time.

Chairman or leader interaction. The importance of the chairman or leader role in meetings is reflected in the substantial proportion of communication time that the chairman or leader communicated during a meeting, either by transmitting information or by being addressed. On the average, the chairman or leader spoke or initiated interactions (PCHSP) more than a third of the time (35%) and, in one

Table 8
Cumulative Numbers and Percentages of Meetings Dominated
by Increasing Numbers of Participants

Number of participants required to account for at least 50% of communication time	Academic		Business		Government		All meetings	
	N	%	N	%	N	%	N	%
1	8	50.00	7	43.75	3	18.75	18	37.50
2	14	87.50	13	81.25	11	68.75	38	79.17
3	15	93.75	16	100.00	12	75.00	43	89.58
4	16	100.00	16	100.00	15	93.75	47	97.92
5	16	100.00	16	100.00	16	100.00	48	100.00

case, as much as 96 percent of the time. The chairman or leader spoke almost twice as much in academic meetings on the average as in government meetings.

Interactions were directed specifically to the chairman or leader (PCHAD) nearly a quarter of the communication time (23%). Typically, these were responses to requests by the chairman or leader for a participant to give a report or to comment on something. In this regard, it was common in small committee and staff meetings for each group member to be asked in turn to give an oral account of his activities since the last meeting or to give a progress report on some delegated responsibility. Frequently, the chairman began the meeting by summarizing his own activities and any new developments of interest to the group. He then called for reports from the members in the order in which they were seated around the table or room. An opportunity for discussion followed each report.

Table 9 shows that the chairman or leader was among the "dominant" speakers in exactly two-thirds of the meetings, and among the addressees who were specifically addressed more than 50 percent of the time, in very nearly the same percentage (64.6%) of the meetings. Table 10 shows that in 52 percent of meetings either the chairman or leader spoke or initiated interactions more than any other participant and in 42 percent one or the other was addressed more than anyone else. Clearly, the chairman or leader role in a meeting was central and the person in that role played a very vocal role.

Direction of communication interactions. The majority (83%) of interactions were discussions in which the conversation went back and forth among several participants (PDISCUSS). Uni-directional presentations in which, for example, a participant gave a report to the whole group, accounted for only 16 percent of the communication time (PPRESENT), and did not even occur in 29 percent of the meetings. In those 34 meetings in which they occurred, uni-directional presentations accounted for 23 percent of the communication time on the average and for as much as 93 percent in the one academic class lecture (A16) that was observed.

Availability of communication interactions. Ninety-nine percent of all observed interactions were public (PPUBLIC) and could be heard or seen by all or most participants. Less than one third of one percent of all interactions were private communications (PPRIVATE). Note that public and private interactions do not sum to 100 percent because the .8 percent of interactions that involved the entire group (PCTALL) were not coded as either public or private. These multiple conversations were most often a combination of both public and private interactions, all occurring at the same time.

The actual frequency of private interactions among meeting participants is slightly underestimated in Appendix E because most private communications occurred at the same time as other, public

Table 9

Numbers and Percentages of Meetings in which the Chairman or Leader Was

Among the Speakers or Addressees Dominating the Communication Time

	<u>Academic</u>		<u>Business</u>		<u>Government</u>		<u>All meetings</u>	
	N	%	N	%	N	%	N	%
Chairman or Leader included among speakers dominating communication time	12	75.00	9	56.25	11	68.75	32	66.67
Chairman or Leader included among addressees dominating communication time	10	62.50	10	62.50	11	68.75	31	64.58

Table 10
Numbers and Percentages of Meetings in which
the Chairman or Leader Communicated
or Was Addressed Most

	<u>Academic</u> N	<u>Business</u> N	<u>Government</u> N	<u>All meetings</u> N %	
Communicated most					
Chairman	3	1	5	9	18.75
Leader	7	5	4	16	33.33
Total	10	6	9	25	52.08
Addressed most					
Chairman	3	3	5	11	22.92
Leader	5	3	1	9	18.75
Total	8	6	6	20	41.67

interactions. Whenever that happened, private communications were coded as simultaneous interactions and only the more important public conversation or interaction was recorded in detail. Unless they were the only interactions occurring, private interactions were not documented fully. Furthermore, due to their covert nature, private interactions were probably less likely to be seen by the observer than were public interactions and may have been missed in some cases. For these reasons, the variable PPRIVATE represents only observed, non-simultaneous private communications, which were indeed infrequent.

A possible upper limit for the percentage of private communications is provided by adding the percentage of simultaneous communications (PSIM) to the percentage of non-simultaneous private communications (PPRIVATE). If all the simultaneous communications had included private interactions, which they did not, private communications still would have represented at most only eight percent of the communication time on the average.

Nature of communication interactions. Sixty-three percent of communication interactions were factual statements (PFACTUAL), 12 percent questions (PQUEST), and 19 percent responses to those questions (PRES P). The proportions of each of the three types of interaction were surprisingly similar in academic, business, and government meetings; there was less than five percent variation in average percentages among the three types of meetings. Fewer than three percent of the interactions in meetings were control statements (PCONTROL) directing participants to do something. Even in the 38 meetings in which they were observed, control statements accounted for less than four percent of all interactions. Unfortunately, the data are not available to verify whether these control statements were most often made by chairmen and leaders. Social or non-task related statements (PSOCIAL) were equally infrequent, less than three percent overall and less than four percent in the 33 meetings in which such statements were observed. Contrary to a common stereotype, the participants observed in these meetings were almost entirely occupied with matters of business once the meeting began. Socializing was frequent, however, before and after the meeting.

Medium of communication. Ninety-seven percent of all interactions were entirely oral (PORAL) and 99 percent had some oral component (PORAL, POW, POP, POG, POR). The three groups of meetings were essentially identical in this respect and even for meetings at the lowest end of the range 85 percent of all interactions were oral. Written (PWRITTEN) and physical (PPHYS) interactions each accounted for less than one tenth of one percent of communication on the average and for only four percent of communication time at the most.

Because written and physical interactions and the combined mediums--oral-gesture, oral-physical, oral-reading, and oral-written--occurred so rarely, it is relevant to consider the data for only those meetings in which such interactions did occur. Written interaction without any oral component (PWRITTEN) was observed in only one academic meeting (A16), the classroom lecture in which a professor wrote on the blackboard. In that meeting, written communication accounted for slightly more than four percent of the communication time. In only four meetings, A16, B9, G1, and G9, did a communicator talk and write at the same time (POW). In these meetings, participants spent an average of one percent of the communication time writing on blackboards or drawing pen and pencil diagrams to elaborate or illustrate what they were talking about.

Solely physical interactions (PPHYS) were observed in only one meeting (A11) in which a participant distributed samples of an academic course catalog to the other meeting participants. The exchange accounted for less than one percent of the communication interactions in that meeting. Simultaneous oral and physical exchanges among participants (POP) were more common and occurred in nine (19%) of the meetings. Nevertheless, these interactions were very brief and so

accounted, on the average, for only one percent of the interactions in these meetings. These interactions consisted of participants handing documents, papers, or similar objects to other participants at the same time as the distributor was talking.

Gestures (PGESTURE) were observed only as an accompaniment to oral communication (POG). Combinations of oral communication and gestures occurred in one-third of all meetings and accounted for two percent of the communication time in those meetings.

Students of nonverbal communication, or paralanguage, appear to hold that we are constantly communicating with other people by our gestures, facial expressions, stance or posture of our bodies, or even by the direction and nature of our gaze. From that perspective, the proportion of gestures recorded in this study seems miniscule, perhaps due to the restrictive or limited definition of gestures used in this study. Gestures had to convey some specific factual information such as expression of a quantity, a dimension or size, or a direction rather than a purely affective state (see Appendix A, Medium).

Reading aloud from text (POR) was observed in nearly half (46%) of the meetings and accounted for two percent of the communication time. Frequently, the speaker would quote to the group from some document--a letter, memo, or regulation--the contents of which were not otherwise available to the meeting participants.

Number of topics. Figure 5 shows that the numbers of topics discussed during meetings (NTOPIIC) varied widely. While the modal number of topics was one, the median number was three, and the average number, five. Twenty-three separate topics were discussed in one meeting (G5). The three groups of meetings were fairly similar on this measure.

In all, 244 topics were discussed in the 48 meetings. The amounts of time devoted to each topic are shown in Table 11. Two-thirds of all topics were discussed 10 minutes or less. In fact, although it is not shown in the table, seven percent of the topics were discussed for less than one minute, i.e., they were recorded at only one moment of observation. The average length of time topics were discussed was 14.7 minutes ($\bar{s} = 25.93$) but five topics (in meetings B7, B9, B14, G2, and G9) were each discussed for more than two hours.

Each topic was categorized according to the proportion of the total communication time that was taken up by that topic. For example, if in a certain meeting 44, 5, and 6 minutes of discussion had been devoted to topics 1, 2, and 3 respectively, then topic 1 took up 80 percent of the time ($44 \div 55$) and topics 2 and 3 took up 9 and 11 percent ($5 \div 55$ and $6 \div 55$), respectively. Almost half (49%) the

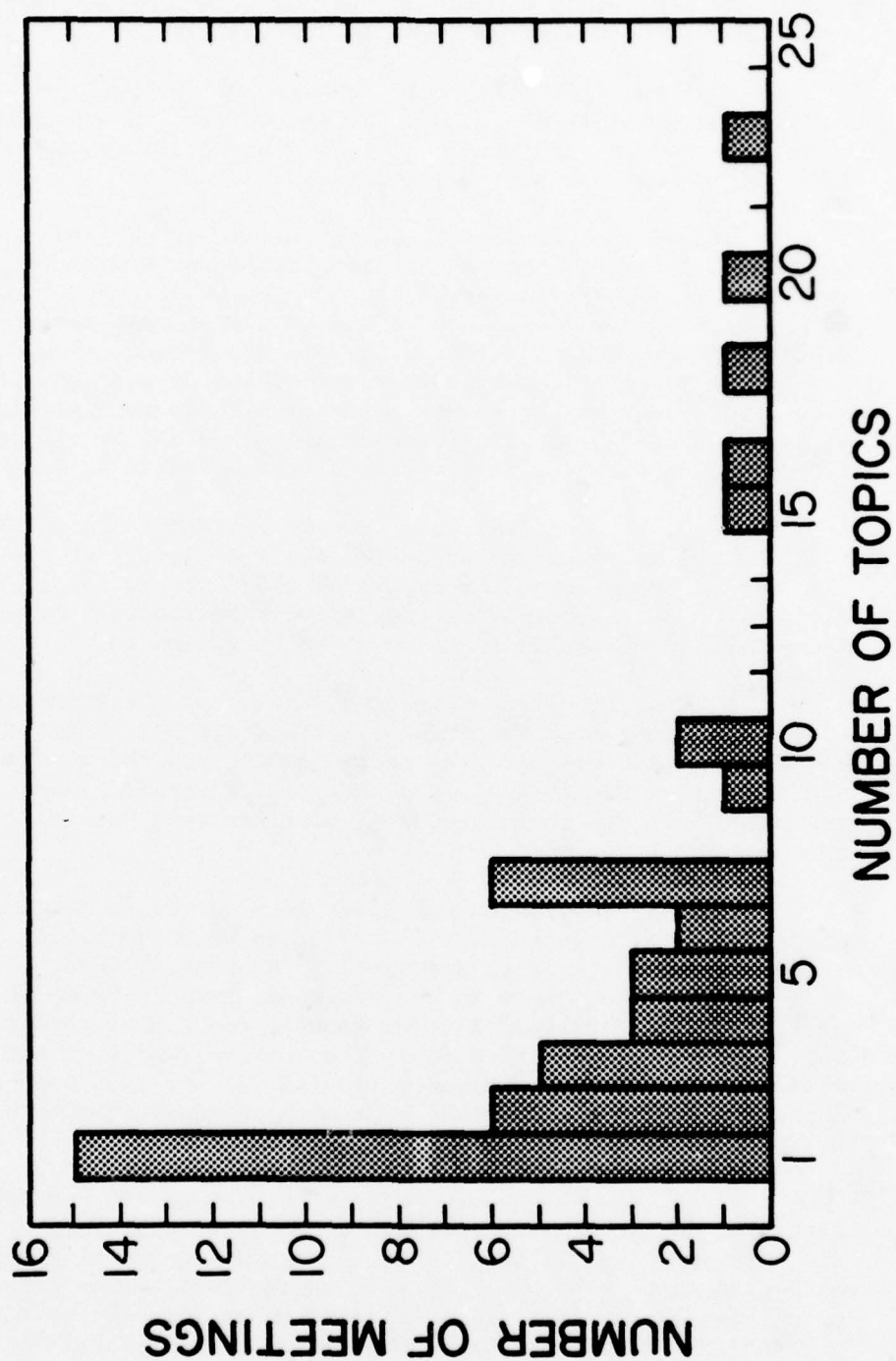


Figure 5. Distribution of the numbers of meetings at which various numbers of topics were discussed.

Table 11

Amounts of Time Devoted to Topics

Amount of time devoted to topic (min)	Number of topics ^a	Percent of topics
1-10	163	66.80
11-20	37	15.16
21-30	13	5.33
31-40	9	3.69
41-50	7	2.87
51-60	5	2.05
61-70	2	.82
71-80	1	.41
81-90	0	.00
91-100	0	.00
101-110	1	.41
111-120	1	.41
121-130	1	.41
131-140	0	.00
141-150	1	.41
151-160	1	.41
161-170	2	.82

Note: Topic times exceeding the upper bounds of a category are included in the next higher category, e.g., the time 10.5 is included in category 11-20.

^a Total number of topics = 244.

topics were discussed no more than 25 percent of the communication time (NTOP 25, PTOP 25). An additional 10 percent of the topics were discussed between 25 and 50 percent of the time (NTOP 50, PTOP 50). In any one meeting, no more than one topic could be discussed more than 50 percent of the communication time (NTOP 75, NTOP 100). Still, two percent of all topics were discussed between 50 and 75 percent of the time (PTOP 75) and a substantial 39 percent of all topics were discussed more than three quarters of the time (PTOP 100). A special tabulation of a part of these data shows that 15 meetings (31%) were devoted entirely to a single topic.

Number of changes in location. A finding of some importance for teleconferencing systems is that there was a great deal of

participation movement in these meetings--persons coming, going, distributing handouts, and changing seats. Participants moved around in 44 (92%) of the meetings (NCHANGE) and in those 44 meetings there was an average of 13 changes per meeting. Due to a considerable amount of skewness in these data, however, the median, 6, may be more representative of the number of changes per meeting. For example, in one meeting (G2), there were 89 changes.

Because a participant could change locations repeatedly, it is important to consider the number of changes per person (NPERCHG). For 44 meetings in which there were changes, the average number per person was six, and the median, four. During one meeting (G10), one person moved 26 times.

In addition to the number of changes and the number of people changing locations, a more specific record was maintained of the number of times people entered or left the meeting room while the meeting was in progress (NENT and NLEFT, respectively).

In four very large meetings (B1, G2, G3, G6), however, people repeatedly entered and left the meetings in large groups with the result that the observer was unable to record the individual entries and exits. Consequently, no record of entries or exits was kept for those meetings. The first set of statistics reported in Appendix E for each of the variables NENT and NLEFT is therefore based only on the 44 meetings for which records were available; the second set for each variable is based on the 27 (61%) and 24 (54%) meetings for which entries and exits, respectively, were observed and recorded.

There was an average of three entries and three exits in those meetings in which they occurred. The numbers of people entering and leaving government meetings were much greater than for either academic or business meetings. Government participants were more than twice as likely on the average to enter a meeting late and about one and a half times as likely on the average to leave early. These data, together with observer impressions that participants in government meetings were typically rushed and hurried, may suggest that government participants have more external time constraints that make it difficult for them to maintain a schedule.

In all subsequent analyses involving the variables NENT and NLEFT, the eight missing values (four for NENT and four for NLEFT) for the four meetings in which records were not kept have been replaced by the appropriate business or government group mean. That is, for the variable NENT, 2 was substituted for the one missing business meeting and 3 for the three missing government meetings. The corresponding mean values for the variable NLEFT are 2 and 2, respectively. Substitution of the mean values for those missing is a conservative treatment of the data since the means are probably underestimates of the actual numbers of times people entered and left these particular meetings. Recall that so many people entered and left these meetings in

large groups that the observer was unable to keep track of the movements.

Number of supplemental communication aids used during meetings. Supplemental communication aids (NAIDS) were used in 42 (88%) of the 48 meetings. In those 42 meetings, an average of six aids ($M_d = 4$) was used. At the extreme, 29 separate aids, mostly graphs and maps, were used in one government meeting (G6). More detailed information about the kinds of aids used in these meetings, the nature of that use, and the probable implications for designing teleconferencing systems is provided later in the section entitled Supplemental Communication Aids (p. 54).

Correlation Among Variables

Although each of the dependent variables provides important information, all need to be considered in relation to each other. Pearson product-moment correlation coefficients for 67 of the dependent variables are presented in Appendix F. The variable PGESTURE is excluded because it was not observed in any of the meetings. Two hundred and fifty-four or about 11 percent of the correlations were statistically significant ($p < .001$). By chance, only slightly more than two should have been significant at the p -level chosen.

Many of these significant correlations indicate interesting relationships among the variables or among groups of variables. For example, the length of a meeting, MTGTIME, is related to the number of participants (NPART, $r = .55$), to the number of speakers (NSPEAKER, $r = .64$), and to the number of addressees (NADD, $r = .67$). It would appear that long meetings are not only large meetings, but they also tend to have a large number of speakers and addressees. As informative as these pair-wise correlations appear to be, the great number of variables that are highly correlated with each other, e.g., NPART, NSPEAKER, NADD, NCHANGE, NPERCHG, NENT, and NLEFT, makes meaningful interpretation difficult and suggests that some variables are redundant.

Fifteen-variable subset. To reduce the number of variables, a subset of the original 68 was selected for further analysis. Variables included in the subset were chosen to satisfy at least one of the following criteria:

- the variable was interesting and meaningful from the perspective of teleconferencing design
- the variable reflected a considerable amount of variability among meetings thus demonstrating at least the potential for discriminating among meetings

- the variable represented a set of variables of a similar nature, i.e., it was one of several variables with high positive intercorrelations (NPART selected in place of NPRES; NCHANGE in place of NPERCHG, NENT, or NLEFT)
- the variable was the more interesting of two or more complementary variables, i.e., when variables exhibited high negative correlations, the more interesting was chosen (PDISCUSS selected in place of PPRESENT; PCT 1 in place of PCT 2, 3, 4, 5, or PSIM)
- the variable had non-zero data values for a majority of the meetings, i.e., infrequently observed variables were not selected.

In all, fifteen variables were selected according to these criteria. They are:

MTGTIME	PMTOTH	PCHAD
NPART	NSPEAKER	PDISCUSS
PCTMT	NADD	NTOPIC
PCT 1	PALLAD	NCHANGE
PMTNCOM	PCHSP	NAIDS

Principal component analysis. Table 12 presents the Pearson product-moment intercorrelations among the 15 variables. The correlations indicate that some groups of variables are still highly correlated. For example, MTGTIME, NPART, NSPEAKER, NADD, NCHANGE, and NAIDS all correlate highly with each other and likely represent a single dimension or characteristic of meetings. Principal component factor analysis¹ was used to factor the 15-variable correlation matrix and to identify other similar but more complex and less-readily perceptible relationships. Eigenvalues for the complete 15-component solution, the proportion of variance accounted for by each component, and the cumulative proportion of total variance are presented in Table 13. The eigenvalues for the first three components are 5.650, 2.444, and 1.875, respectively. These components together account for 66.5 percent of the total variance and represent a reasonable

¹The principal component analyses used were: (1) Computer Program PCOMP developed by Dr. B. F. Green, Jr., The Johns Hopkins University, 1978 using IMSL routines and (2) UCLA Biomedical Computer Program BMDP4M.

Table 12

Correlation Matrix for the 15-variable Subset

	MTGTIME	NPART	PCTMT	PCT 1	PMTNCOM	PMTOTH	NSPEAKER	PCHSP	NADD	PCHAD	PALLAD	PDISCUSS	NTOPIC	NCHANGE	NAIDS
MTGTIME	.55*	.55*	.55*	.55*	.55*	.55*	.55*	.55*	.55*	.55*	.55*	.55*	.55*	.55*	.55*
NPART															
PCTMT															
PCT 1															
PMTNCOM															
PMTOTH															
NSPEAKER															
PCHSP															
NADD															
PCHAD															
PALLAD															
PDISCUSS															
NTOPIC															
NCHANGE															
NAIDS															

* p < .001

Table 13
Eigenvalues and Percentages of Variance Explained by
15 Unrotated Principal Components

Component	Eigenvalue	Proportion of variance explained	Cumulative proportion of total variance
1	5.650	.377	.377
2	2.444	.163	.540
3	1.875	.125	.665
4	1.130	.075	.740
5	.977	.065	.805
6	.754	.050	.855
7	.718	.048	.903
8	.476	.032	.935
9	.428	.028	.963
10	.204	.014	.977
11	.157	.011	.988
12	.099	.006	.994
13	.036	.003	.997
14	.034	.002	.999
15	.018	.001	1.000

simplification of the original 15 variables. A common statistical criterion for selecting components is to retain those with eigenvalues greater than one. In this case, however, a 1-component solution was chosen rather than the 4-component solution that satisfied that criterion because the fourth component accounted for relatively little added variance, duplicated previously high variable loadings, and was not directly interpretable.

The unrotated component loading and communality for each variable in the 3-component solution is shown in Table 14. The minimum communality value is .237 indicating that not less than 23.7 percent of the variance for any single variable was accounted for by the 3-component solution.

Table 15 gives the variable-component loadings after the components were rotated to a Varimax criterion of fit. The total variance explained by the three components is unchanged (66.5%) but the three now account for 31, 19, and 16 percent of the total respectively.

Component 1 reflects variation in overall meeting size. Six of the variables, MTGTIME, NPART, NSPEAKER, NADD, NCHANGE, and NAIDS, have positive loadings on this component that equal or exceed .622. These variables all measure the magnitude of several meeting characteristics and relate directly to the size and complexity of the meeting. It appears that large meetings are long, make use of numerous communication aids, and have many participants who interact a great deal and move around frequently. The opposite is true for small meetings.

Component 2 reflects the interactive nature of meeting communication. The loadings show a contrast between the uni-directional presentation variable PALLAD (loading = -.924) and two interactive discussion variables PDISCUSS (loading = .900) and PCHAD (loading = .781). The moderate negative loading (-.401) on NPART, the number of participants, suggests that interactive discussion decreases as the number of people at a meeting increases. Furthermore, the moderate positive loading on PCT 1 (.564) indicates that the proportion of simultaneous conversations (the opposite of PCT 1) tends to increase as interactive discussion decreases and the number of people increases.

Component 3 is also a contrast, this time between (a) the proportion of the meeting time devoted to communication, PCTMT (loading = -.952) and (b) time spent in other activities, PMTOTH (loading = .879) and in no communication, PMTNCOM (loading = .571). The moderate positive loading of MTGTIME (.439) on this component indicates that these other, non-communication activities may either add to the length of meetings or are more likely to be part of longer, more lengthy meetings. At any rate, meetings in which there are substantial other activities differ from those meetings in which there are not.

Table 14
Unrotated Component Loadings and Communalities
for the 3-Component Solution

Variable	Component			Communality
	1	2	3	
MTGTIME	.721	.463	.145	.756
NPART	.919	-.069	.115	.863
PCTMT	-.255	-.804	.454	.918
PCT 1	-.399	.320	.292	.346
PMTNCOM	-.038	.529	-.253	.345
PMTOTH	.306	.739	-.403	.801
NSPEAKER	.907	-.039	.324	.929
NADD	.889	.057	.341	.910
PALLAD	.547	-.474	-.586	.868
PCHSP	-.392	.221	-.338	.317
PCHAD	-.567	.307	.492	.658
PDISCUSS	-.566	.467	.545	.835
NTOPIC	.410	-.071	.253	.237
NCHANGE	.820	.173	.182	.735
NAIDS	.647	.159	.093	.452

Table 15

Rotated Component Loadings for the 3-Component Solution

Variable	Component		
	1	2	3
MTGTIME	.750	-.013	.439
NPART	.837	-.401	.032
PCTMT	-.096	.039	-.952
PCT 1	-.157	.564	.064
PMTNCOM	-.091	.107	.571
PMTOTH	.157	-.061	.879
NSPEAKER	.935	-.231	-.048
NADD	.940	-.161	.022
PALLAD	.118	-.924	-.024
PCHSP	-.476	.062	.294
PCHAD	-.203	.781	-.074
PDISCUSS	-.155	.900	.036
NTOPIC	.469	-.056	-.120
NCHANGE	.816	-.182	.189
NAIDS	.622	-.168	.193

Note: Percentages of variance explained by component 1, 2, and 3 are 31.11, 19.44, and 15.91, respectively. Percent of total variance explained is 66.46.

Each of the three principal components represents an important characteristic of face-to-face meetings. Although they do not define meeting differences precisely and explain only two-thirds of the variability among meetings, the principal components provide a more complete understanding of how meetings differ on the ensemble of variables than is possible when the variables are considered individually.

Supplemental Communication Aids

As reported in the section headed Number of supplemental communication aids used during meetings (p. 47), supplemental communication aids were used in 88 percent of the meetings and, on the average, six aids were used per meeting. More detailed information about the use of these aids is provided by data collected with the Supplemental Communication Aid Information Card (Figure 3).

Types of aids used. Table 16 shows, among other things, the numbers of aids of various types that were used in the meetings and the proportions of meetings in which each was used. For example, documents were used in 75 percent of all meetings, hand-written notes in 19 percent, and charts and posters in 14 percent. Note also that aids other than those listed were used in 19 meetings (40% of the total) and that an average of three of these "other" aids was used in those meetings. Data on the average number of aids used per meeting should be interpreted with caution because in some instances a large number of aids were used in only a few meetings. The average of 22 vu-graphs, for example, does not mean that the average meeting used this many vu-graphs, but that on the single occasion when they were used, they were used 22 times.

Figure 6 shows the frequency with which each type of aid was used in the three groups of meetings. Some aids were obviously used more often in certain kinds of meetings. For example, while documents were used frequently in all meetings, many more were used in government meetings than in the other two groups. Likewise, government meetings made use of a much more diverse collection of aids, using about two and seven times as many "other" aids as business and academic meetings, respectively (see also Table 18 later). Blackboards were used exclusively in academic meetings despite their availability in some business and government meeting rooms, and flipcharts and vu-graphs were used predominantly in business meetings. This agrees with common notions of these aids as respective academic and business tools of the trade.

The proportionate use of particular aids for each of the three groups is shown in Table 17. Documents, e.g., letters, memos, printed materials, and xerox copies, were by far the most commonly used aids, accounting for 44 percent of all aids used. Charts and posters, especially prepared flipcharts used to outline oral presentations and talks, as well as graphs of sales and growth trends, represent another

Table 16
Use of Various Types of Supplemental Communication Aids

Type of Aid	Number of aids used	Number of meetings in which aid was used	Percent of meetings in which aid was used	Mean number of aids used in these meetings
Document	117	36	75	3
Handwritten note	11	9	19	1
Blackboard	8	1	2	8
Chart, Poster, Schema	53	7	14	6
Audio recording	1	1	2	1
Film	2	2	4	1
Vu-graph	22	1	2	22
Slide presentation	1	1	2	1
Video	0	0	0	0
Other	51	19	40	3

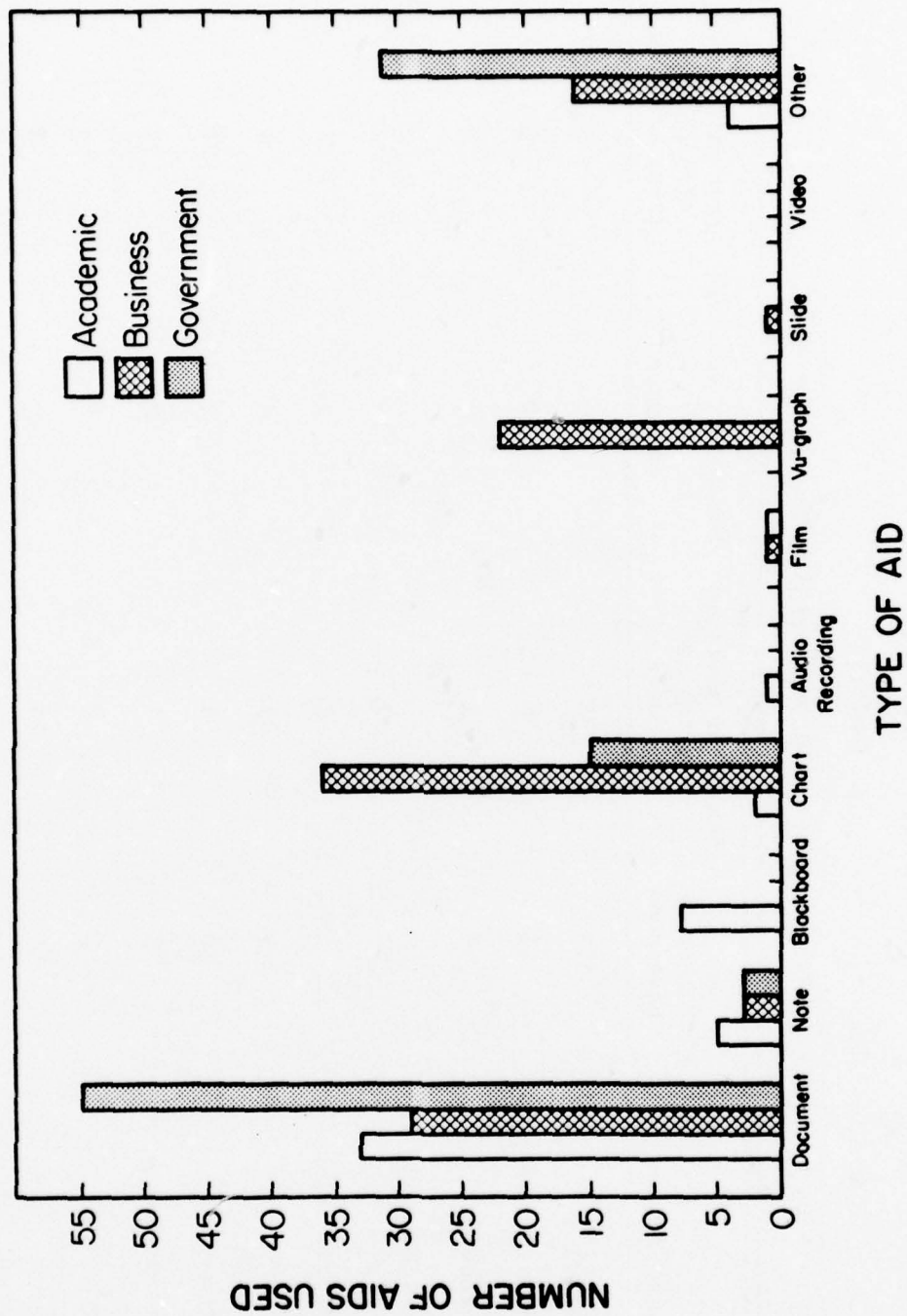


Figure 6. Numbers of supplemental communication aids used in the three groups of meetings.

Table 17
Proportionate Use of Various Types of Aids

Type of aid	Academic ^a	Business ^b	Government ^c	All meetings ^d
Document	62.26	26.85	52.38	43.98
Handwritten note	9.43	2.78	2.86	4.14
Blackboard	15.09	.00	.00	3.01
Chart, poster, schema	3.77	33.33	14.29	19.92
Audio recording	1.89	.00	.00	.38
Film	.00	.93	.95	.75
Vu-graph	.00	20.37	.00	8.27
Slide presentation	.00	.93	.00	.38
Video tape	.00	.00	.00	.00
Other aids	7.55	14.81	29.52	19.17

^a Number of academic aids of all types = 53.

^b Number of business aids of all types = 108.

^c Number of government aids of all types = 105.

^d Total number of aids of all types = 266.

20 percent of all aids used. Vu-graphs were numerous in the sense that many were used. However, all were observed in a single training meeting where individual vu-graphs were used to depict record-keeping forms.

Although slide presentations and films each had a low frequency of use (less than 1%), this does not truly reflect their impact on the meeting process. Unlike documents or vu-graphs where each document or graph was counted separately, slide and film presentations were considered unitary events irrespective of the length of the

presentation. A single film might then have had an impact that was much greater than its recorded frequency.

There were no video tapes used in any of the meetings. The single audio recording observed in one academic meeting was used only to record the meeting process for the subsequent preparation of minutes.

The miscellaneous "other" category was very large and accounted for 19 percent of all aids. The diversity of these other aids is impressive (Table 18). Maps were the most common of the other aids and were used predominantly in government meetings. Some of these maps were as large as 5 x 6 feet and were literally taped to the walls of the meeting room so all participants could see them. How these maps could have been used in a teleconferenced meeting is far from clear. Certainly, some adaptation would have been necessary. Similar problems apply to many of the other aids. For example, how would participants have compared the colors and textures of carpet samples if the meeting in which this was done had been teleconferenced? Because these other aids appear to be more common than expected, more consideration clearly needs to be given to their accommodation in teleconferencing systems.

Distribution of aids. Table 19 shows how aids of all types were distributed to participants. Those aids in which distribution is irrelevant, for instance, film presentations, are listed as not relevant. Fully two-thirds of the aids were distributed by the person who was speaking as an accompaniment to his presentation or discussion. The bulk of the remaining aids, 21 percent, was not distributed by any of the participants at the time of use. Instead, most of these aids were distributed by some other means and were in place prior to the meeting. For example, packets of documents frequently were arranged at each participant's place before the meeting started. The documents were then used as needed during the meeting.

Table 20 shows the participants to whom aids were distributed or to whom they were available as, for example, in the special case of viewing films, slides, or blackboards. Nearly one-fifth of the aids, 17 percent, were used only by the speaker and were distributed to no one else. In this connection, lecture notes or speech outlines were not considered supplemental communication aids and are not included in the speaker-only category. Aids in this category do include documents such as tables of statistics, or letters and correspondence from which the speaker was quoting or reading to the other participants. Twenty-one percent of the aids were distributed to only a limited number of participants and more than half the aids (58%) were distributed to everyone.

Preparation of aids. The constraints of teleconferencing make it important to know whether aids were made up for use before the meeting or were created during the meeting. If an aid was prepared

Table 18
Numbers of Other Aids

Other aids	Academic	Business	Government	All meetings
Maps		1	15	16
Brochures, pamphlets, booklets		6	2	8
Photographs of build- ings			5	5
Blueprints			2	2
Computer printouts		2		2
Books		2		2
Membership directories			2	2
Voter registration cards			2	2
Pieces of equipment	2			2
Drawing (sketch) of equipment			1	1
Sample of carpet	1			1
Journal	1			1
Sign-in sheet (atten- dance record)		1		1
Reservation form		1		1
Oversized sample of record form		1		1
Calendar		1		1
Wallet card of emer- gency procedures		1		1
Ticket to symphony			1	1
Newspaper clipping			1	1
Totals	4	16	31	51

Table 19
 Percentages of Aids Distributed to
 Participants by Various Means

Means of Distribution	Academic ^a	Business ^b	Government ^c	All meetings ^d
Speaker	56.60	81.48	59.05	67.67
Chairman	1.89	1.85	4.76	3.01
Chairman while speaking	1.89	.00	1.90	1.13
Secretary	3.77	.93	7.62	4.14
Secretary while speaking	.00	.00	.95	.38
Other means	33.96	12.96	23.81	21.43
Not relevant	1.89	2.78	1.90	2.26

^a Number of academic aids = 53.

^b Number of business aids = 108.

^c Number of government aids = 105.

^d Total number of aids = 266.

Table 20

Percentages of Aids Distributed to Various Recipients

Recipient of Aid	Academic ^a	Business ^b	Government ^c	All meetings ^d
Speaker only (1 copy)	22.64	9.26	20.95	16.54
Some participants	11.32	12.04	35.24	21.05
All participants	58.49	71.30	43.81	57.89
Not relevant	7.55	7.41	.00	4.51

^a Number of academic aids = 53.

^b Number of business aids = 108.

^c Number of government aids = 105.

^d Total number of aids = 266.

sufficiently in advance of a meeting, it could be distributed to remote participants by post or by some other means. This could not be done for aids such as blackboard drawings generated during the meeting itself. Table 21 shows that 90 percent of the aids were prepared and available before the meeting. Unfortunately, the data do not indicate how long before the meeting the aids were available. In at least one instance, a meeting was actually delayed because a participant had to wait his turn at a copier to reproduce handouts for the meeting. Still, with proper planning, the vast majority of aids could probably be prepared with sufficient lead time to permit their distribution to remotely-located teleconfererees.

Content of aids. The content of aids is also important for the design of teleconferencing systems because it bears on the resolution required to transmit images of documents and graphics. For this reason, estimates were made of the extent to which each aid was composed of textual, statistical, graphic, or pictorial material.

Of a total of 266 aids for all three groups, 79 percent had some textual content, 28 percent were at least in part statistical, 17 percent at least partly graphic, and 7 percent at least partly pictorial. Because the same aid could be any combination of the four

Table 21
Percentages of Aids Prepared Before
and During the Meetings

When aid was prepared	Academic ^a	Business ^b	Government ^c	All meetings ^d
Before the meeting	75.47	95.32	93.33	89.95
During the meeting	20.75	4.63	4.76	7.89
Not relevant	7.55	1.85	1.90	2.26

^a Number of academic aids = 53.

^b Number of business aids = 108.

^c Number of government aids = 105.

^d Total number of aids = 266.

content types, e.g., both textual and statistical, the relative proportion of each kind of content is important. Table 22 shows the numbers and percentages of aids that contained various percentages of textual, statistical, graphic, or pictorial material. For example, 53 percent of all aids were entirely textual, less than one percent were entirely statistical, 11 percent were totally graphic, and four percent totally pictorial.

Textual aids, that is, those with at least some textual content, tended to be predominantly textual. Those that were not, were composed about equally of text and either statistical or graphic material. When an aid contained statistical material, the statistics most frequently comprised either less than 10 percent or about 50 percent of the total content. Graphic aids (in which the textual portion of simple, descriptive legends was not considered) tended to be either all graphic or less than 50 percent graphic in which case the remainder was most likely to be textual. Pictorial aids, although relatively infrequent, tended to be predominantly pictorial.

Use of aids. Ninety-seven percent of all aids were distributed for immediate use (Table 23). The remainder were distributed

Table 22

Numbers and Percentages of Aids Composed of Various Percentages
of Textual, Statistical, Graphic, and Pictorial Content

Percent of content	Textual ^a		Statistical ^b		
	Number of aids	Percentage of textual aids	Percentage of all aids	Number of aids	Percentage of statistical aids
10	2	.95	.75	30	40.54
20	0	.00	.00	5	6.76
30	3	1.43	1.13	14	18.92
40	1	.48	.38	0	.00
50	20	9.52	7.52	21	28.38
60	0	.00	.00	0	.00
70	1	.48	.38	2	2.70
80	17	8.10	6.39	1	1.35
90	24	11.43	9.02	0	.00
100	142	67.62	53.38	1	1.35

Table 22 (concluded)

Percent of content	Graphic ^c			Pictorial ^d		
	Number of aids	Percentage of graphic aids	Percentage of all aids	Number of aids	Percentage of pictorial aids	Percentage of all aids
10	5	11.11	1.88	1	5.56	.38
20	0	.00	.00	0	.00	.00
30	4	8.89	1.50	1	5.56	.38
40	0	.00	.00	0	.00	.00
50	6	13.33	2.26	4	22.22	1.50
60	0	.00	.00	1	5.56	.38
70	0	.00	.00	0	.00	.00
80	0	.00	.00	0	.00	.00
90	1	2.22	.38	1	5.56	.38
100	29	64.44	10.90	10	55.56	3.76

Note: Total number of aids = 266.

^a Number of aids containing some textual material = 210.

^b Number of aids containing some statistical material = 74.

^c Number of aids containing some graphic material = 45.

^d Number of aids containing some pictorial material = 18.

Table 23
Percentages of Aids that Were Used
Immediately or at Some Later Time

When aid was used	Academic ^a	Business ^b	Government ^c	All meetings ^d
Immediate use	96.23	97.22	98.10	97.37
Future use	1.89	1.85	.95	1.50
Not relevant	1.89	.93	.95	1.13

^a Number of academic aids = 53.

^b Number of business aids = 108.

^c Number of government aids = 105.

^d Total number of aids = 266.

during the meeting but were not used at that time. Of the latter, some were distributed to be used for information purposes after the meeting.

Purpose of aids. Ninety-six percent of all aids were used to convey information in support of the on-going conversation (Table 24). Two percent of the aids required from the participants some action or response such as signatures on authorization forms or names on an attendance record. This latter requirement for responses from participants, although infrequent, places special demands on a teleconferencing system. It would be difficult to obtain signatures from participants at remote stations unless perhaps some sort of Telautograph system were available.

Participant Questionnaire

Three hundred and twenty-two questionnaires were distributed to participants in 39 meetings. Distribution was either not possible or was inappropriate in the remaining nine meetings, three of which were academic, three business, and three government. One hundred and three of the questionnaires had to be left with participants to be completed after the meeting. Of these, 70 (68%) were returned by mail. The remaining 219 questionnaires were both distributed and

Table 24

Percentages of Aids that Were Used Only for Information
or That Required Participant Action

Purpose of aid	Academic ^a	Business ^b	Government ^c	All meetings ^d
Information	92.45	95.37	99.05	96.24
Participant action	3.77	3.70	.00	2.26
Not relevant	3.77	.93	.95	1.50

^a Number of academic aids = 53.

^b Number of business aids = 108.

^c Number of government aids = 105.

^d Total number of aids = 266.

collected at the meetings, and of these 207 (95%) were returned. In all, 277 or 86 percent of the questionnaires were returned. Return rates for academic, business, and government meetings were 92, 90, and 76 percent, respectively.

Two hundred and seventy-six of the returned questionnaires were usable and were analyzed. The responses to these questionnaires are discussed individually below. Questions 4, 6, and 8 are discussed separately.

Advance notice. Responses to Question 1 show that participants were generally aware well in advance that a meeting was scheduled (Table 25). Nearly half knew the meeting would be held days or even weeks in advance. For a third of the participants, notification was not particularly relevant because their meetings were routinely scheduled. There were few differences among groups except that somewhat more academic meetings were routinely scheduled.

Travel distance. Responses to Question 2 show that the majority (55%) of all meetings were held in the participant's own office or building (Table 26). There is, however, a large contrast between academic and government meetings in this respect. More than two-thirds of the academic meetings were held within the participant's

Table 25
Percentages of Participants Who Received Advanced
Notice of Scheduled Meeting Time
(Question 1)

Amount of advance notice	Academic ^a	Business ^b	Government ^c	All meetings ^d
Minutes	4.72	7.95	4.88	5.80
Hours	.00	2.27	3.66	1.81
Days	21.70	26.14	17.07	21.74
Weeks	26.42	37.50	36.59	32.97
Months	2.83	5.68	8.54	5.43
Meeting is routinely scheduled, e.g., meets every Friday	44.34	19.32	29.27	31.88
No response	.00	1.14	.00	.36

^a Number of academic respondents = 106.

^b Number of business respondents = 88.

^c Number of government respondents = 82.

^d Total number of respondents = 276.

Table 26
Percentages of Participants Whose Meetings
Were Held at Various Locations
(Question 2)

Location of meeting	Academic ^a	Business ^b	Government ^c	All meetings ^d
In participant's own office	6.60	7.95	13.41	9.06
Out of participant's office but within the building	62.26	48.86	20.73	45.65
To another building at the same location	23.58	17.05	8.54	17.03
To another building but within the metropolitan area	7.55	9.09	34.15	15.94
Out of town	.00	17.05	23.17	12.32
No response	.00	.00	.00	.00

^a Number of academic respondents = 106.

^b Number of business respondents = 88.

^c Number of government respondents = 82.

^d Total number of respondents = 276.

own office or building. Most government participants (57%), on the other hand, attended meetings at other locations within the metropolitan area or out of town. In fact, 23% of government participants and 17% of business participants were required to travel out of town to attend their meetings. None of the academic participants had to do so.

When participants did travel to a meeting out of town, the average travel distance was 61 miles ($\bar{M}_d = 40$). One participant travelled as far as 300 miles. Business participants travelled further on the average, 73 miles ($\bar{M}_d = 55$), than government participants ($\bar{M} = 52$; $\bar{M}_d = 40$).

Travel time. The time required to get to a meeting was, of course, closely related to the location of the meeting and to the distance that had to be travelled to reach that location (Table 27).

Table 27
Percentage of Participants Who Required Various
Amounts of Time to Travel to Their Meetings
(Question 3)

Travel time	Academic ^a	Business ^b	Government ^c	All meetings ^d
Less than 10 minutes	92.45	71.59	51.22	73.55
10 to 30 minutes	6.60	5.68	18.29	9.78
More than 30 minutes	.94	22.73	30.49	16.67
No response	.00	.00	.00	.00

^a Number of academic respondents = 106.

^b Number of business respondents = 88.

^c Number of government respondents = 82.

^d Total number of respondents = 276.

Still, nearly three quarters of the participants required less than ten minutes to get to their meeting. About seventeen percent had to travel more than thirty minutes.

Non-related business. Responses to Question 5 were almost uniform for the three groups (Table 28). Nearly one quarter (24%) of

Table 28

Percentages of Participants Who Intended to Do Other
Things in Addition to Attending the Meeting
(Question 5)

Intention to do other things	Academic ^a	Business ^b	Government ^c	All meetings ^d
Yes	23.58	26.14	23.17	24.28
No	75.47	73.86	76.83	75.36
No response	.94	.00	.00	.36

^a Number of academic respondents = 106.

^b Number of business respondents = 88.

^c Number of government respondents = 82.

^d Total number of respondents = 276.

the participants indicated that they intended to do other things in addition to attending the meeting (Table 29).

Role in meeting. Question 7 asked participants to identify the role they took in the meeting: chairman, secretary, participant, or non-participant. As it turned out, responses to this question were not particularly useful and so were not analyzed in detail. It is interesting, however, that four percent of the respondents identified themselves as "non-participants." To some people, attendance at a meeting apparently was not equivalent to participation. This supports the distinction made in this study between those present (NPRES) and those actively participating (NPART).

Table 29

Frequencies of Other, Non-meeting Activities that Participants
Intended to Accomplish While at the Meeting Site

Other activities	Academic	Business	Government	All meetings
Discuss other related matters with meeting participants	7	9	1	17
Attend to office and job duties unrelated to meeting (office hours, teaching, admin. tasks, reports)	7	3	4	14
Conduct business unrelated to meeting (unspecified)	2	3	1	6
Talk with non-participants	1		5	6
Deliver mail/messages	1	2		3
Prepare/read correspondence	1		1	2
Attend earlier meeting	1	1		2
Prepare for subsequent meeting			1	1
Make arrangements for party	1			1
Meet new employee		1		1
Run computer program			1	1
Attend to mechanical job problems		1		1
Not specified	4	3	5	12

Purpose of meeting. The intent of Question 9 was to elicit from participants the single most important reason for having the meetings. Question 10 allowed respondents to select from a list of 14 purposes those that characterized the meeting. The purposes from which participants could select in Question 10 had been developed from a pilot questionnaire in which a sample of meeting-goers had been asked to suggest several purposes for holding meetings. The responses obtained were consolidated into the fourteen.

The responses to both questions were unexpected. Due perhaps to the open-ended nature of the question, participant responses to Question 9 were highly individualistic and were so inconsistent, even among participants in the same meeting, that interpretation of this question is difficult. An attempt was made to match the 256 responses or reasons given by participants in Question 9 with the fourteen purposes of Question 10. (Twenty of the 276 participants who completed the questionnaire failed to respond to Question 9.) Seventy-seven percent of the responses could be assigned to one of the fourteen purposes. An additional 12.5 percent were assigned to a new category that might best be called routine because it includes responses such as "We always meet on Friday." "We are required by law to meet monthly," "We just meet to take care of routine business." The remaining 10.5 percent of the 256 were unique and could not be classified in a particular category.

Analyzing the responses to Question 9 in this way shows that there were only five meetings in which all participants at a meeting gave one and the same reason for having the meeting. Moreover, there were only 28 meetings in which one of the fourteen purposes was given more often than any other. These 28 meetings include the previous five. For the other 11 meetings, none of the fourteen was given most often. Instead, two or more reasons or purposes were given equally often and still other reasons were given less frequently. These were clearly multi-purpose meetings.

Table 30 shows how the 28 single-purpose meetings are distributed among the purposes of Question 10. Discussion, review, planning, and routine are among the most common reasons for these meetings. It should be reemphasized that even these so-called single-purpose meetings do not represent a consensus among the participants. One purpose may have been given most often, but other purposes were also given by the participants for these same meetings.

The lack of consensus about a meeting's purpose was equally evident from participant responses to Question 10. In this question, participants checked an average of eight different purposes for each meeting. Figure 7 shows the numbers of academic, business, and government meetings that served multiple purposes. The abscissa represents the number of different purposes checked in response to Question 10 by participants in the same meeting. The ordinate shows the number of meetings that had various numbers of multiple purposes. In no instance did participants indicate that a meeting had met for a single purpose, and four meetings were described as having as many as twelve different purposes.

The number of purposes associated with a particular meeting was related positively to the number of participants ($r = .62$). This is at least in part a consequence of the participant-specific nature of some of the purposes. Consider a participant giving a report to the

Table 30
Distribution of Purposes Among the
28 Single-Purpose Meetings

Purpose of meeting	Academic	Business	Government	All meetings
Administer or supervise something			2	2
Plan, organize, or coordinate something	2	2		4
Evaluate something			1	1
Tend to personnel matters				0
Work on or prepare something				0
Present something				0
Discuss something	4	2		6
Review progress	1	2	2	5
Solve a problem		1	1	2
Reach a decision about something			2	2
Get to know someone				0
Observe or inspect something				0
Train or teach someone		2		2
Buy or sell something				0
"Routine"	2		2	4

group. He might well think the meeting's purpose was to "Present something to the group." The other members of the group who listened to the report might have concluded that the meeting's purpose was to "Discuss something and exchange information." Thus, the purpose of a meeting may depend on one's perspective.

Table 31 shows the proportions of Question 10 responses that participants attributed to one or more of the fourteen purposes. There were few differences among the three groups. Discussion was the most common purpose checked, followed in order by planning, administration, presentation, review, decision-making, evaluation, and problem-solving. As was true for Question 9, discussion, planning, and review were again common meeting purposes.

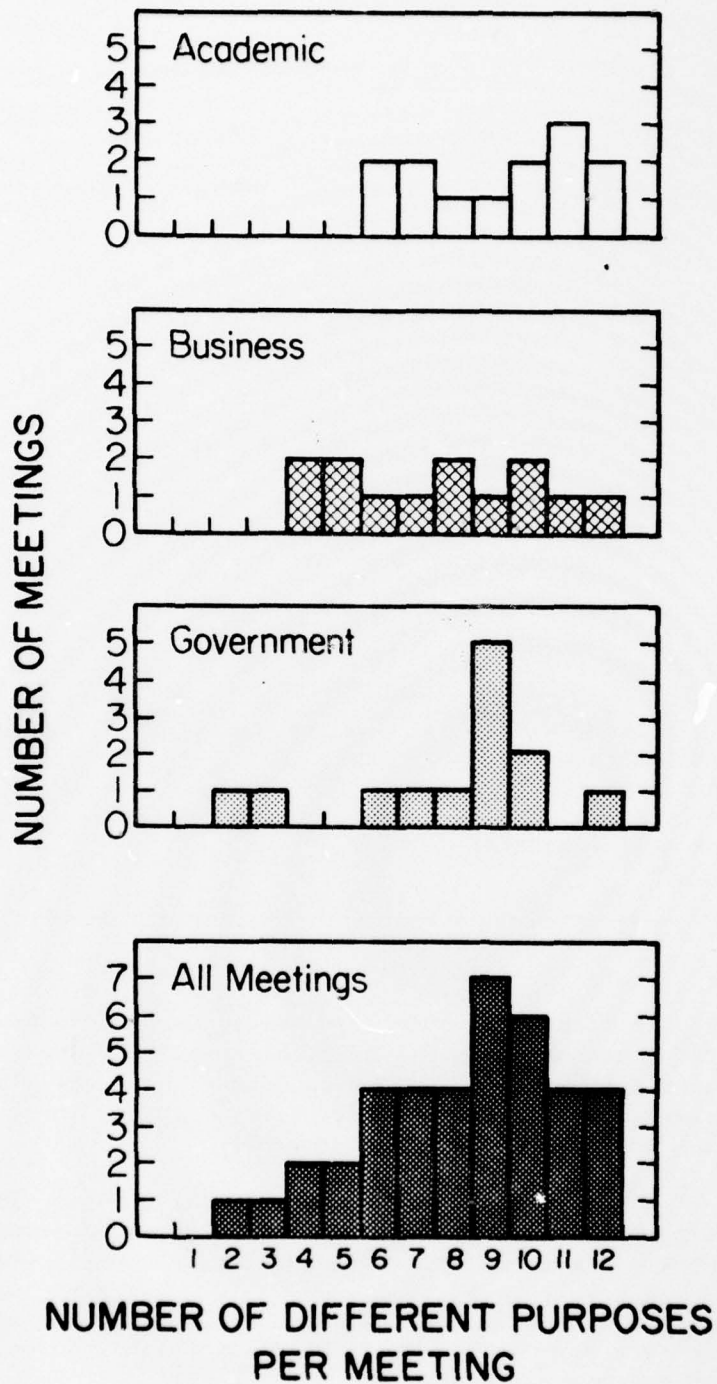


Figure 7. Numbers of academic, business, and government meetings that served various numbers of purposes.

Table 31
Percentages of Responses Attributed to the Meeting Purposes of Question 10

Purpose of meeting	Academic ^a	Business ^b	Government ^c	All meetings ^d
Discuss something; Exchange information; Get advice or feedback on something	17.91	18.44	16.67	17.72
Plan, organize, or coordinate something; Delegate responsibility	12.07	16.71	7.10	12.07
Administer or supervise something; Set policy	11.47	9.22	12.65	11.13
Present something (report, demonstration, etc.) to the group	10.66	10.09	12.65	11.04
Review progress; Bring people up to date	9.46	11.24	12.65	10.87
Reach a decision about something	12.07	6.92	10.80	10.13
Evaluate something or someone	9.05	5.76	11.11	8.65
Solve a problem; Generate ideas (brainstorm)	6.44	7.49	4.63	6.25
Work on or prepare something	4.63	4.03	4.01	4.28
Train or teach someone; Study or learn something	.60	5.76	1.85	2.48
Get to know someone; Meet someone	1.41	1.44	3.09	1.88

Table 31 (continued)

Purpose of meeting	Academic ^a	Business ^b	Government ^c	All meetings ^d
Observe or inspect something	2.01	1.73	.93	1.63
Tend to personnel matters (recruit or hire someone, discipline someone, express grievances, etc.)	1.61	.00	.31	.77
Buy or sell something	.60	1.15	.31	.68
Other	.00	.00	.93	.26
No response	.00	.00	.31	.09

^aNumber of purposes checked by the 106 academic respondents = 497.

^bNumber of purposes checked by the 88 business respondents = 347.

^cNumber of purposes checked by the 82 government respondents = 324.

^dTotal number of purposes checked by the 276 respondents = 1168.

The list of purposes provided in Question 10 was apparently adequate to describe most of the meetings. Less than one third of one percent of the respondents suggested other purposes.

Alternatives to face-to-face meetings. Responses to Question 11 show that an overwhelming 81 percent of the respondents felt their meeting could not have been conducted without face-to-face contact (Table 32). Eighteen percent suggested the meeting could have been handled without getting together but with one exception all felt that to do so would have been less satisfactory.

Table 32

Percentages of Participants Who Believed Meeting Purpose(s)

Could or Could Not Have Been Accomplished

Without Face-to-face Contact

(Question 11)

Face-to-face Requirement	Academic ^a	Business ^b	Government ^c	All meetings ^d
Yes, could have been accomplished	17.92	25.00	10.98	18.12
No, could not have been accomplished	82.08	73.86	86.59	80.80
No response	.00	1.14	2.44	1.09

^a Number of academic respondents = 106.

^b Number of business respondents = 88.

^c Number of government respondents = 82.

^d Total number of respondents = 276.

The alternatives to a face-to-face meeting suggested by participants were of three types. The business of the meeting could have feasibly been conducted: (1) by telephone, (2) by written correspondence, including memos, newsletters, mail ballots, and status

reports, or (3) by individual meetings among selected participants. Unsolicited comments suggested that compared to face-to-face, all these alternatives would be inefficient, time-consuming, cumbersome, and far less satisfactory. One frequent comment was that face-to-face meetings allow for discussion of ideas and issues unrelated to regular business matters; participants felt that regrettably this would not be the case with some of the other alternatives.

Rating scale data. Questions 12-18 asked participants to rate their meeting on several dimensions. Tables 33-39 show the proportions of responses at each rating for these seven questions, respectively. The mean and standard deviation of participant responses for each question also are given in these tables.

Three quarters of the participants responding to Question 12 felt that it was very convenient to attend their meeting (Table 33). The mean response for all participants was also very high (4.49). In agreement with Questions 2 and 3, however, government meetings to which participants in general had to travel farthest and longest, were rated somewhat less convenient. Academic meetings were by far the most convenient to attend and this, too, is consistent with Questions 2 and 3.

In response to Question 13, most participants said their meetings dealt with only moderately urgent business matters (Table 34; $\bar{M} = 3.26$). Academic meetings were the least urgent; government meetings were the most urgent. In all, five percent of the participants considered their meeting to be not at all urgent, while a quarter felt their meetings to be very urgent.

In Question 14, the majority (56%) of participants rated their meetings as dealing with matters that were non-confidential in nature (Table 35). Furthermore, the mean rating was only .96. Surprisingly, business meetings were rated less confidential or proprietary on the average than academic meetings and not substantially more confidential than government meetings. The relatively low ratings for all three groups of meetings may indicate some sampling bias. It is likely that the observer was not allowed to attend highly sensitive, confidential meetings. In one business setting, for example, the observer was advised from the start of the study that he would not be allowed to observe either high-level policy meetings or meetings at which legal issues were to be discussed.

Participants responding to Question 15 felt in general that their meetings had been effective in accomplishing their purposes (Table 36; $\bar{M} = 3.97$). Forty-three percent felt their meeting, in fact, had been very effective. Again, there were few differences among the groups.

Table 33
Percentages of Rated Convenience
(Question 12)

Rating scale	Academic ^a	Business ^b	Government ^c	All meetings ^d
0 (Not at all convenient)	.00	2.27	2.44	1.45
1	.00	4.55	6.10	3.26
2	2.83	2.27	8.54	4.35
3	.94	4.55	6.10	3.62
4	10.38	4.55	15.85	10.14
5 (Very convenient)	84.91	80.68	58.54	75.72
No response	.94	1.14	2.44	1.45
Mean	4.80	4.49	4.08	4.49
Standard deviation	.60	1.22	1.40	1.13

^aNumber of academic respondents = 106.

^bNumber of business respondents = 88.

^cNumber of government respondents = 82.

^dTotal number of respondents = 276.

Table 34
Percentages of Rated Urgency
(Question 13)

Rating scale	Academic ^a	Business ^b	Government ^c	All meetings ^d
0 (Not at all urgent)	5.66	6.82	3.66	5.43
1	12.26	3.41	1.22	6.16
2	12.26	18.18	14.63	14.86
3	33.96	30.68	19.51	28.62
4	19.81	18.18	20.73	19.57
5 (Very urgent)	16.04	22.73	39.02	25.00
No response	.00	.00	1.22	.36
Mean	2.98	3.18	3.72	3.26
Standard deviation	1.40	1.41	1.34	1.42

^aNumber of academic respondents = 106.

^bNumber of business respondents = 88.

^cNumber of government respondents = 82.

^dTotal number of respondents = 276.

Table 35
Percentages of Rated Confidentiality
(Question 14)

Rating scale	Academic ^a	Business ^b	Government ^c	All meetings ^d
0 (Not at all confidential)	50.00	55.68	64.63	56.16
1	22.64	15.91	7.32	15.94
2	8.49	14.77	8.54	10.51
3	11.32	7.95	13.41	10.87
4	6.60	4.55	3.66	5.07
5 (Very confidential)	.94	1.14	1.22	1.09
No response	.00	.00	1.22	.36
Mean	1.05	.93	.86	.96
Standard deviation	1.33	1.27	1.34	1.32

^aNumber of academic respondents = 106.

^bNumber of business respondents = 88.

^cNumber of government respondents = 82.

^dTotal number of respondents = 276.

Table 36
Percentages of Rated Effectiveness
(Question 15)

Rating scale	Academic ^a	Business ^b	Government ^c	All meetings ^d
0 (Not at all effective)	.00	.00	.00	.00
1	4.72	3.41	2.44	3.62
2	12.26	7.95	4.88	8.70
3	16.98	20.45	13.41	17.03
4	26.42	29.55	25.61	27.17
5 (Very effective)	39.62	38.64	51.22	42.75
No response	.00	.00	2.44	.72
Mean	3.84	3.92	4.21	3.97
Standard deviation	1.21	1.10	1.02	1.13

^aNumber of academic respondents = 106.

^bNumber of business respondents = 88.

^cNumber of government respondents = 82.

^dTotal number of respondents = 276.

Responses to Question 16 must be interpreted with care (Table 37). The question asks whether the meeting dealt comprehensively with points or issues of business raised during the meeting by the participant himself. If the respondent did not raise any points, he should not have responded to this question. Although the number of people who did not respond is higher for this question than for any of the other questions, it is not as high as might be expected. Consequently, participants may have responded on behalf of participants in general and about all the points raised during the meeting. Nevertheless, most respondents felt that issues had been dealt with comprehensively and thoroughly ($M = 3.71$).

Slightly more than one third of the participants responding to Question 17 believed their meeting to have been very necessary or important (Table 38). On the average, government meetings were rated somewhat more important than either academic or business meetings. Academic and business meetings were rated nearly the same in importance and necessity.

Question 18 was intended to assess the extent to which the observer's presence during the meeting might have changed the character or function of that meeting. While the responses undoubtedly reflect in part the leniency of participants, 97 percent of responses were at the low end of the scale (Table 39). The mean rating of .15 seems to indicate that the observer was minimally disruptive. No one thought the observation to be very disruptive and less than three percent thought it to be even moderately so.

Accuracy of questionnaire responses. A problem associated with all questionnaires is the accuracy of the answers that respondents give. The reasons for inaccuracy may be many, e.g., deliberate distortion, inattention or insensitivity, or failure to remember. Responses to Questions 4, 6, and 8 were compared with objective data collected in this study to provide an estimate of the accuracy of participant responses to at least these questions.

Because the responses to these questions have to be matched with observed data on a meeting by meeting basis, it is inappropriate to report the percentage of responses given by all the participants to each response option as was done for the other questions. Instead, the percentage of respondents that gave the correct response or responses for each question is reported below.

In Question 4, participants were asked whether the meeting they attended had started: (a) early, (b) on time or within 10 minutes of the pre-arranged starting time, (c) 10 to 30 minutes late, or (d) more than 30 minutes late. Seventy-one percent of all respondents correctly indicated when their meeting had started. Seventy-five percent of academic respondents and 87 percent of business respondents gave the correct response, but only 46 percent of the government respondents did so.

Table 37
Percentages of Rated Comprehensiveness
(Question 16)

Rating scale	Academic ^a	Business ^b	Government ^c	All meetings ^d
0 (Not at all comprehensively)	.00	2.27	.00	.72
1	6.60	4.55	1.22	4.35
2	11.32	9.09	9.76	10.14
3	19.81	25.00	14.63	19.93
4	32.08	28.41	26.83	29.35
5 (Very comprehensively)	19.81	27.27	43.90	29.35
No response	10.38	3.41	3.66	6.16
Mean	3.53	3.60	4.06	3.71
Standard deviation	1.18	1.25	1.06	1.19

^aNumber of academic respondents = 106.

^bNumber of business respondents = 88.

^cNumber of government respondents = 82.

^dTotal number of respondents = 276.

Table 38
Percentages of Rated Importance
(Question 17)

Rating scale	Academic ^a	Business ^b	Government ^c	All meetings ^d
0 (Not at all important)	2.83	1.14	.00	1.45
1	5.66	4.55	2.44	4.35
2	16.98	10.23	7.32	11.96
3	23.58	20.45	12.20	19.20
4	29.25	30.68	25.61	28.62
5 (Very important)	21.70	32.95	51.22	34.06
No response	.00	.00	1.22	.36
Mean	3.36	3.34	4.17	3.72
Standard deviation	1.30	1.21	1.06	1.25

^aNumber of academic respondents = 106.

^bNumber of business respondents = 88.

^cNumber of government respondents = 82.

^dTotal number of respondents = 276.

Table 39
Percentages of Rated Disruptiveness
(Question 18)

Rating scale	Academic ^a	Business ^b	Government ^c	All meetings ^d
0 (Not at all disruptive)	91.57	94.32	87.80	91.30
1	6.60	3.41	6.10	5.43
2	.00	.00	.00	.00
3	.94	1.14	6.10	2.54
4	.94	.00	.00	.36
5 (Very disruptive)	.00	.00	.00	.00
No response	.00	1.14	.00	.36
Mean	.13	.07	.24	.15
Standard deviation	.53	.36	.74	.57

^aNumber of academic respondents = 106.

^bNumber of business respondents = 88.

^cNumber of government respondents = 82.

^dTotal number of respondents = 276.

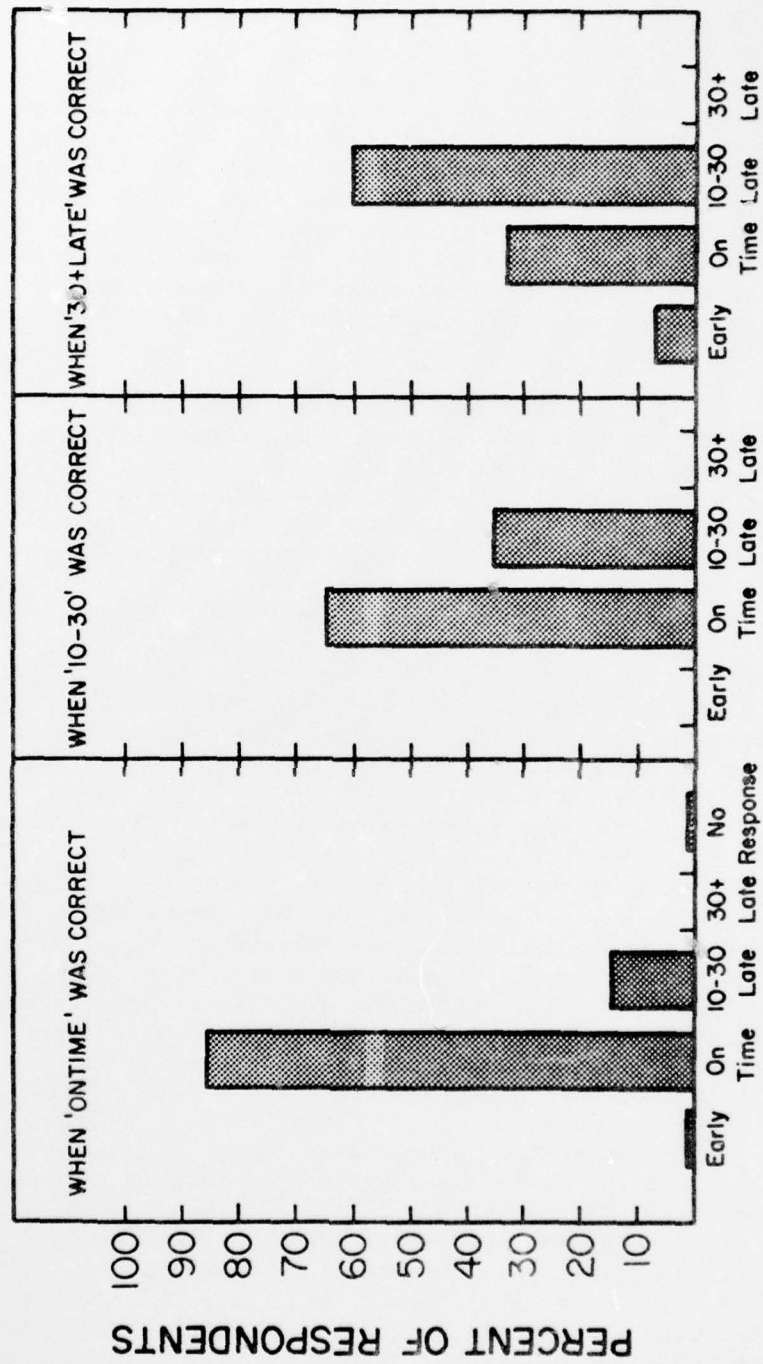
Figure 8 shows the distributions of responses as a function of which response option was correct. For example, when the meeting started on time, 86 percent of the responses were correct. Twelve percent of the respondents claimed incorrectly that the meeting had started 10 to 30 minutes late and about one and a half percent said it started early. For those meetings that did start 10 to 30 minutes late, 35 percent responded correctly, but a majority (65%) failed to recognize the delay and claimed the meeting had started on time. Similarly, for the three meetings that started more than 30 minutes late, none of the participants responded correctly. All claimed the meeting had started more nearly on schedule, although most recognized that the meeting had been somewhat delayed. It appears that as the delay increases, participants tend to underestimate the amount of the delay.

One caution that should be observed in interpreting these data is that there is no guarantee that all participants were correctly informed about starting times. The fact that 31 of the 39 meetings for which questionnaire data were collected started late suggests that many participants may not have been aware of exact scheduled starting times and consequently would be unable to answer Question 4 accurately.

In Question 6, participants were asked if certain characteristics did or did not apply to their meeting. Assigned seating was observed in only one government meeting (G5) and five (83%) of the six respondents in that meeting responded correctly. Participants in three other meetings, however, stated there had been assigned seating when none was observed.

A chairman (leaders not included) was observed in 18 of the 39 meetings in which questionnaires were distributed. In those meetings, 94 percent of the 188 respondents correctly said there was a chairman (academic = 95.18, business = 93.88, government = 91.07). Participants in six additional meetings said there had been a chairman when none was observed. This overestimation may be due not only to participant inaccuracy but also to the arbitrary distinction made by the observer between chairman and leaders (p.31). Participants in these meetings may have considered a strong leader to be a chairman despite his lack of formal status.

Secretaries were observed in 12 meetings but were acknowledged by only 69 percent of the 138 respondents in those meetings (academic = 83.08, business = 73.68, government = 50.00). Again, participants in six meetings said there had been a secretary when none was observed. It is possible that one member of the group in these meetings may have been designated secretary but because that person took no active role in the meeting, e.g., reading or taking minutes, or distributing documents, that person's role was not recognized by the observer.



RESPONSES

Figure 8. Distribution of responses to Question 4 as a function of which response was correct.

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JOHNS HOPKINS UNIV BALTIMORE MD DEPT OF PSYCHOLOGY
A STUDY OF MEETING AND CONFERENCE BEHAVIOR.(U)
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Minutes of previous meeting were used in only seven of the meetings and were identified by 81 percent of the 80 respondents in those meetings (academic = 100.00, business = 100.00, government = 71.70). Participants in six other meetings claimed minutes had been used when none were observed.

Agendas were somewhat more common. They were observed in 14 meetings and were identified by 90 percent of the 109 respondents (academic = 96.97, business = 66.67, government = 91.80). A considerable number of participants in 18 additional meetings claimed there had been an agenda for those meetings as well. Those participants may have been using a more liberal definition of agenda than the observer, who recorded the use of agendas only when an actual document was either distributed to participants or was used by the chairman to outline the meeting process. Verbal enumerations of topics to be covered during the meeting were not considered by the observer to be agendas.

Procedural rules, such as parliamentary procedures or rules of order, were used in only five meetings, three of which were government meetings. Sixty-seven percent of the 61 respondents in the five meetings correctly stated that rules were used (academic = 73.08, business = 55.56, government = 65.38). In ten additional meetings, participants stated procedural rules had been used when none were observed.

Question 8 asked participants to identify which of a list of audio-visual aids had been used during their meeting. The use of documents, including printed materials and xerox copies, was correctly reported by 77 percent of the 238 respondents in the 31 meetings where they were used (academic = 81.63, business = 67.61, government = 81.16). Documents were reported but not observed in three additional meetings.

Handwritten notes were observed in just eight meetings and were correctly identified by only 28 percent of the 43 respondents in those meetings. Notes were reported to have been used in 23 additional meetings in which the observer reported none. There are several possibilities for this large discrepancy: (a) the participants may have used an implicit definition of handwritten notes which differed from the one used by the observer (for example, the latter did not include speech outlines or personal note-taking), (b) the use and exchange of notes was accomplished so covertly that the observer was unaware of their use, or (c) participants simply overestimated the use of handwritten notes.

Blackboards were not observed to have been used in any of the meetings in which questionnaires were distributed. Nevertheless, participants reported their use in two meetings. Most likely, participants were reporting the presence of a blackboard in the meeting room and not its actual use.

Charts, posters, and schematic drawings (including graphs) were observed in four meetings, reported in three more, but correctly identified by only four (20%) of the 20 respondents (academic = 0.00, business = 0.00, government = 57.14).

Only one audio recording was observed. The small percentage of respondents (17%) who acknowledged its use in one academic meeting (A13) is probably due to the fact that the recording was not played back during the meeting. Instead, the recorder was used only to record the meeting process for later preparation of minutes.

Vu-graphs were used in only one business meeting (B14) and all but one of the 22 respondents (95%) correctly reported their use.

Slide presentations were observed in none of the questionnaire meetings; yet participants in one meeting reported their use.

Films were used in two meetings, one business (B15) and the other government (G10). Ninety-five percent of the 21 respondents in those two meetings, all of the 12 government respondents and eight of the nine participants who responded in the business meeting, reported the use of the films. That any of the business respondents failed to mention the film is surprising because the film, a training film on fire safety, was the main emphasis of the meeting and accounted for nearly one third of the meeting time.

Scale models and samples were observed in four meetings but only identified correctly by seven (17%) of the 41 respondents (academic = 11.76, business = 20.83, government = 0.00).

Aids other than those listed were observed to have been used in eight meetings. Due perhaps to varying definitions of what constituted another aid, only eight percent of the 57 respondents in those meetings acknowledged their use (academic = 66.67, business = 4.17, government = 0.00). Other aids were reported in four additional meetings in which they either were not observed or were attributed to some other category by the observer.

The accuracy of participant responses to Questions 6 and 8 is summarized in Table 40. Overall, participants more accurately reported the general meeting characteristics listed in Question 6 (mean percentage of correct responses for all items = .81) than the use of the communication aids in Question 8 (mean percentage of correct responses for all observed aids = .45). Furthermore, participants identified certain meeting characteristics and aids much more accurately than others. For example, the presence of a chairman and the use of films or vu-graphs were much more readily identified than were the use of procedural rules or charts and scale models. Even more remarkable is the consistent tendency of participants to report additional characteristics and aids that were never observed. Possible explanations for

Table 40
Accuracy of Participant Responses to Questions 6 and 8

Response option	Percent correct responses	Number of meetings in which observed	Number of additional meetings in which reported
Question 6			
Assigned seating	83	1	3
Chairman	94	18	6
Secretary	69	12	6
Minutes	81	7	6
Agenda	90	14	18
Procedural rules	67	5	10
Question 8			
Documents	77	31	3
Handwritten notes	28	8	23
Blackboard	--a	0	2
Charts, posters	20	4	3
Audio recording	17	1	0
Vu-graphs	95	1	0
Slides	--a	0	1
Films	95	2	0
Video tapes	--a	0	0
Scale models	17	4	0
Others	8	8	4

^a Not observed in any of the 39 meetings for which questionnaire data were available.

these discrepancies have been discussed previously, but the tendency to overreport appears to be pervasive and in some instances, of large magnitude. This tendency, together with the bias to underestimate meeting delays and the poor overall accuracy of responses to these questions, suggests that self-report data of the type gathered here leave much to be desired and must be interpreted with extreme caution if objective verification is not possible.

Differences Among Meetings

Effect of group. Several tests were made to determine whether the academic, business, and government meetings differed from each other. Despite the distinctly different backgrounds and occupational objectives of their respective participants, the three groups were amazingly similar on most of the attributes tested.

A multivariate analysis of variance (MANOVA) was used to test for group differences on the 15-variable subset of dependent variables. (See Table 41 for group means and medians.)

The analysis showed no significant differences among the three groups. The F of 1.01 was almost exactly at the expected value, E . Table 42 summarizes the MANOVA results and presents univariate ANOVA's for each of the 15 variables.

When a significant multivariate effect is found, independent univariate ANOVA's of the separate variables are often used to ascertain which of the dependent variables contributed to the effect. In the absence of a significant overall effect there is normally little reason to examine the effect of variables individually. The exploratory nature of the present study, however, justifies doing so in order to identify any possible trends or suggestions that might warrant fuller investigation. Any significant effect at this level of analysis must be interpreted with extreme caution due to the increased experiment-wise error. Discriminant function coefficients, sometimes used instead of univariate F -tests to interpret multivariate results, are also presented in Table 42. A cursory examination of these values, however, did not suggest meaningful differences among the three groups for any of the 15 variables or for combinations thereof. Thus, primary emphasis was focused on the univariate ANOVA's.

In the univariate analyses, only the variable NCHANGE differed significantly among the three groups. The group means for this variable (academic = 5.563, business = 9.688, government = 21.500) show that participants in government meetings moved around approximately four times as often as academic participants and a little more than twice as often as business participants. Pair-wise comparisons of the differences between group means resulted in a significant difference only between academic and government meetings, $t(30) = 2.45$, $p < .02$. It should be pointed out that with proper correction for experiment-

Table 41
Group Means and Medians for the 15-variable Subset

Variable	Means			Medians				
	Academic	Business	Government	All meetings	Academic	Business	Government	All meetings
NTGTIME	61.969	91.094	100.250	84.438	59.500	66.500	68.500	66.250
NPART	7.500	9.188	14.250	10.313	7.500	8.500	8.500	8.250
PCTMT	.927	.935	.924	.929	.968	.973	.974	.973
PCT 1	.948	.920	.907	.925	.981	.952	.933	.957
PMTNCOM	.038	.015	.020	.024	.019	.008	.007	.010
PMTOTH	.022	.048	.046	.039	* ^a	.008	* ^a	* ^a
NSPEAKER	6.500	6.938	10.688	8.042	6.500	6.500	7.500	6.750
NADD	6.063	7.188	10.125	7.792	6.500	7.000	6.000	6.500
PALLAD	.310	.258	.294	.287	.296	.112	.236	.236
PCHSP	.431	.374	.244	.350	.435	.346	.178	.344
PCHAD	.256	.245	.198	.233	.274	.216	.174	.229
PDISCUSS	.858	.839	.794	.830	.944	.969	.848	.900
NTOFIC	5.125	3.563	6.563	5.083	4.500	2.500	4.500	3.100
NCHANGE	5.563	9.688	21.500	12.250	4.500	6.167	8.500	6.000
NAIDS	3.313	6.750	6.563	5.542	3.000	3.833	4.000	3.643

^aValues less than .001.

Table 42
MANOVA for Group Differences^a

Tests of Significance Using Wilks-Lambda Criterion				
Tests of roots	df _{hyp}	df _{error}	F	P
1 through 2	30	62.0	1.007	.476
2 through 2	14	31.5	.370	.974

Univariate F-tests				
Variable	Mean Square	F _{2,45}	P	Standardized discriminant function coefficient
MTGTIME	6393.485	1.305	.281	.229
NPART	197.438	3.147	.053	-.758
PCTMT	.000	.046	.955	-1.696
PCT 1	.007	.678	.513	.718
PMTNCOM	.002	1.613	.211	.215
PMTOTH	.003	.503	.608	-1.679
NSPEAKER	84.771	2.360	.106	1.387
NADD	70.396	1.988	.149	.760
PALLAD	.011	.177	.838	1.464
PCHSP	.147	2.420	.100	.579
PCHAD	.015	.576	.566	.957
PDISCUSS	.018	.341	.713	-.116
NTOPIC	36.021	1.271	.291	-.382
NCHANGE	1094.813	4.260	.020 ^b	-1.082
NAIDS	59.771	1.458	.243	-.435

^aUniversity of Miami (Biometric Laboratory) Computer Program--
Multivariate Analysis of Variance

^bStatistically significant

wise error neither the overall F nor the comparison t would be significant. In other words, the effect of group differences on the number of participant changes is best considered a chance deviation.

One-way ANOVA's were performed on each of the remaining 52 variables, that is, the original 68 minus the 15 analyzed in Table 42 and PGESTURE, to determine if any of them differed among groups. Only two, NSP 75 and NPERCHG, differed significantly. Analysis of variance summary tables for NSP 75, NPERCHG, and for NCHANGE are given in Table 43.

Table 43
ANOVA Summary Tables for NSP 75,
NPERCHG, and NCHANGE

Variables	Source	df	MS	F	P
NSP 75	Groups	2	.6458	4.0435	.0243
	Error	45	.1597		
NPERCHG	Groups	2	151.0833	4.3573	.0186
	Error	45	34.6736		
NCHANGE	Groups	2	1094.8125	4.2598	.0202
	Error	45	257.0083		

Statistics for NSP 75 in Appendix E show that there were no government participants who spoke more than 75 percent of the time. The frequency of academic and business participants in this category is so nearly equal to zero that the significant effect is uninteresting.

The mean numbers of people changing location (NPERCHG) in academic, business, and government meetings were 2.8, 4.2, and 8.7, respectively. Clearly, more people moved about in government meetings, but none of the pair-wise comparisons of mean differences was significant.

The meeting group distinction obviously had no demonstrable effect on the 67 dependent measures considered here. Only three differed as a function of group, and this number is slightly less than the number of statistically significant outcomes expected by chance with $\alpha = .05$.

These findings are consistent with those of earlier sections of this report (General Meeting Characteristics, Nature of Communication Interactions, Supplemental Communication Aids, Participant Questionnaire) which showed that various other measures did not discriminate among academic, business, or government meetings. For example, no differences were found among the groups in scheduled starting times

or in categorized lengths of meetings. Neither was the likelihood that a meeting would be presided over by a chairman rather than a leader related to the meeting group. With few exceptions, the use of supplemental aids and responses to questions on the questionnaire were also quite similar for the three groups. The few exceptions have already been noted.

The finding that some meetings are dominated by a very few participants, most notably the chairman or leader, suggests that the equality of participation in meeting interactions might vary as a function of the meeting group. It might be hypothesized, for instance, that more formal government meetings with more participants might more easily be dominated by a few active participants. The extent to which each meeting departs from total equality among the participants in proportion of communication time can be calculated using an index of "inequality of participation" suggested for this purpose by Hiltz (Hiltz, Johnson, & Agle, 1978). The index serves about the same purpose as Lorenz curves and Gini coefficients used by economists to measure inequality of distribution of income in a society (Samuelson, 1973). The index, which is explained more fully in Appendix G, expresses the degree to which observed participation for each participant differs from the proportion of participation that would have occurred if all participants had contributed equally. The index ranges from zero to one to represent total equality and total inequality, respectively.

Table 44 shows the index of inequality for each of the 48 meetings. Mean index values for academic, business, and government meetings are .5336, .5620, and .5088, respectively, and do not differ significantly when tested by analysis of variance.

In another test of the same hypothesis, Kolmogorov-Smirnov one-sample tests (Siegel, 1956) were used to determine if observed cumulative distributions of participant participation differed from a hypothetical distribution of equal participation. Two academic meetings, four business meetings, and six government meetings differed significantly beyond the .05 level of significance. A multinomial exact test of the distribution 2, 4, 6 indicated no more than chance deviation from expectancy ($p = .16$).

In summary, no reliable, significant differences could be demonstrated among academic, business, or government meetings. Meetings of each group were very much alike on every one of the many dimensions examined here.

Effect of purpose. It was intended that differences among meetings conducted for different purposes be analyzed much as was done for meetings of different groups. A purpose was to have been assigned to each meeting on the basis of responses to Question 9 of the questionnaire. The earlier discussion of those results and those for Question 10 (see section on Participant Questionnaire) make it clear that the

Table 44

Inequality of Participation Among Meeting Participants

Academic		Business		Government	
Meeting number	I ^a	Meeting number	I ^a	Meeting number	I ^a
A1	.1228	B1	.5878	G1	.4590
A2	.5800	B2	.3124	G2	.6629
A3	.1364	B3	.5000	G3	.8529
A4	.7351	B4	.6924	G4	.4004
A5	.4237	B5	.1000	G5	.4258
A6	.7118	B6	.4847	G6	.5372
A7	.6403	B7	.8769	G7	.5577
A8	.3684	B8	.8295	G8	.4286
A9	.4675	B9	.6647	G9	.4284
A10	.5532	B10	.4338	G10	.6461
A11	.5854	B11	.4005	G11	.5463
A12	.4858	B12	.5211	G12	.3574
A13	.5774	B13	.6402	G13	.4459
A14	.7589	B14	.6475	G14	.1428
A15	.4495	B15	.8945	G15	.6847
A16	.9420	B16	.4062	G16	.5542
$\bar{X}_A = .5336$		$\bar{X}_B = .5620$		$\bar{X}_G = .5088$	
$s = .2142$		$s = .2124$		$s = .1627$	
Min = .1228		Min = .1000		Min = .1428	
Max = .9420		Max = .8945		Max = .8529	
		$\bar{\bar{X}} = .5348$			

^aIndex of Inequality of Participation:

$$I = \frac{1/N \sum_{i=1}^N (E_i - O_i)}{1/2(1-1/N)}$$

Where: N = Number of members in group
 O_i = Observed cumulative proportion of statements
 E_i = Expected cumulative proportion if there were total equality of participation; equal to the cumulative proportion of the number of members of the group

data do not support the view that meetings have a single purpose. Even majority opinion of the participants could not be used to identify a single predominant purpose in all cases, nor could the observer assign a single purpose to a meeting unequivocally. Moreover, all alternative procedures for classifying meetings into particular, single-purpose categories proved to be equally arbitrary. Consequently, too few meetings with distinct purposes were available for any analysis of meetings on the basis of intended objective or purpose.

Meeting size. The principal component analysis indicated that a substantial proportion of the variability among meetings was accounted for by the first rotated principal component. This component loaded heavily on the quantity variables and was characterized as a meeting size factor.

Cluster analysis of the same data was done with the UCLA Biomedical Computer Program BMDP2M. Input data were standardized scores for each of the 15 variables. These scores were weighted by the program in approximately the same manner as the first unrotated principal component to yield a single composite score for each meeting. Distance between cases/clusters was measured from the centroid of clusters using an Euclidean metric. The clustering algorithm began by joining the closest (most similar) pair of meetings to form an initial cluster and continued joining most similar pairs of meetings, pairs of clusters, or a meeting with a cluster until all meetings were in a single cluster.

This clustering routine yielded a result that was almost identical to that of the principal component analysis. While the latter identified similarities among the variables across all meetings, the cluster analysis isolated groups or clusters of meetings that were similar for all variables. Not surprisingly, these clusters of meetings differed primarily along a dimension of "meeting size" that was very much like the one represented by the principal component solution. Labelling the dimension as "meeting size" in the clustering solution reflects the predominant influence of the quantity variables and also the subjective or intuitive impression of how the clusters differ. Nonetheless, size is, at least in part, a misnomer because a weighted composite of all 15 variables was used to determine similarities among meetings. Consequently, the meetings within one cluster differ from those of another cluster in more ways than mere size or magnitude. Still, size is the pervasive characteristic of the meetings in these clusters and variations in size will be used to describe and refer to individual clusters.

The tree diagram shown in Figure 9 depicts the manner and order in which meetings were clustered. Meetings are identified on the diagram with the meeting code numbers used in Table 2. At each step or iteration, cluster memberships change as new meetings are added and clusters are merged (as indicated in the figure by the joining of two vertical lines) until eventually all meetings are joined in a single

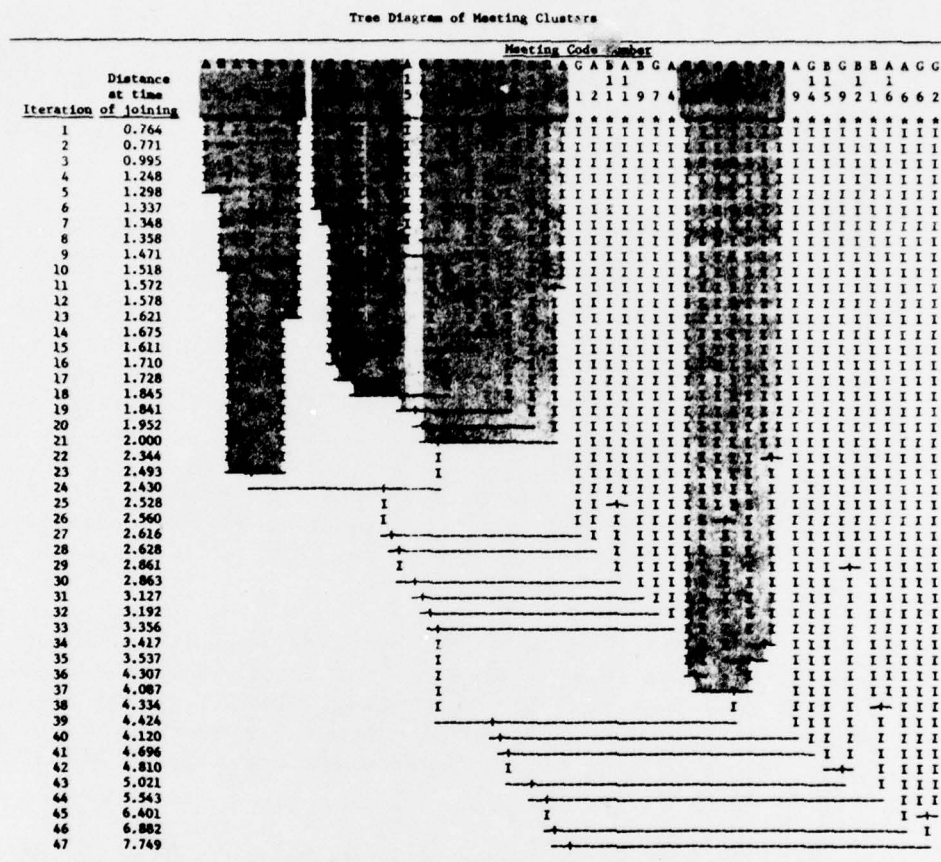


Figure 9. Tree diagram of meeting clusters.

cluster. Meetings that are most similar are joined early in the process (low iteration number). Meetings that are dissimilar are joined only later.

Three distinct and sizeable clusters of meetings are apparent in the joining diagram and are depicted by shading. These clusters were formed at iterations 21, 23, and 37. Together they encompass 65 percent of the meetings. The remaining meetings are only loosely associated with a particular cluster or are distinctly different from all three clusters.

The first cluster includes the first seven meetings from the left, A1, B5, A3, B2, B3, B4, and A12. Figure 10(a) presents a 15-variable profile of these meetings in which the values are the means for the seven meetings on each of the 15 variables. The ordinate in this profile is in arbitrary units so that each variable on the abscissa may be independently scaled in units appropriate to its nature and range. For example, the 1 = 10 minutes for the first variable, MTGTIME, means that each vertical unit represents ten minutes. The unit equivalent varies for other variables. With one exception, the Cluster 1 meetings are small, informal, two-person meetings. The only exception was a two-person meeting that was twice interrupted by two different secretaries delivering messages and so was counted as having four participants.

These meetings are best characterized as small meetings. They were brief (less than 30 minutes) and involved only a couple of participants who spent most of the meeting interacting and discussing one or two topics. There was no simultaneous conversation at these meetings, few activities of a non-communication nature, and little use of communication aids.

The next 17 meetings, A7, G8, G12, G4, A14, A8, A15, G16, B16, B6, A13, A10, G13, B10, B13, G15, and A5, compose a second cluster of meetings. These are somewhat larger and more complex meetings that can be characterized as medium-sized meetings. The profile for these meetings in Figure 10(b) shows that they lasted about one hour and involved a half-dozen or so participants most of whom interacted with each other for most of the meeting. Compared to small meetings, there was more simultaneous conversation and a considerably larger proportion of the meeting interactions were addressed to the participants as a whole with a resulting decrease in interactive discussion. The chairman played a less dominant role in these meetings, speaking and being addressed less often than in the small meetings. Medium-sized meetings were also characterized by more topics of discussion, more movement among participants, and the use of more aids.

The next seven meetings do not constitute a cluster. Instead, they are intermediate between small and medium meetings. They are a little like both in some respects, but at the same time, different from either and cannot be regarded as more like small- or medium-sized meetings.

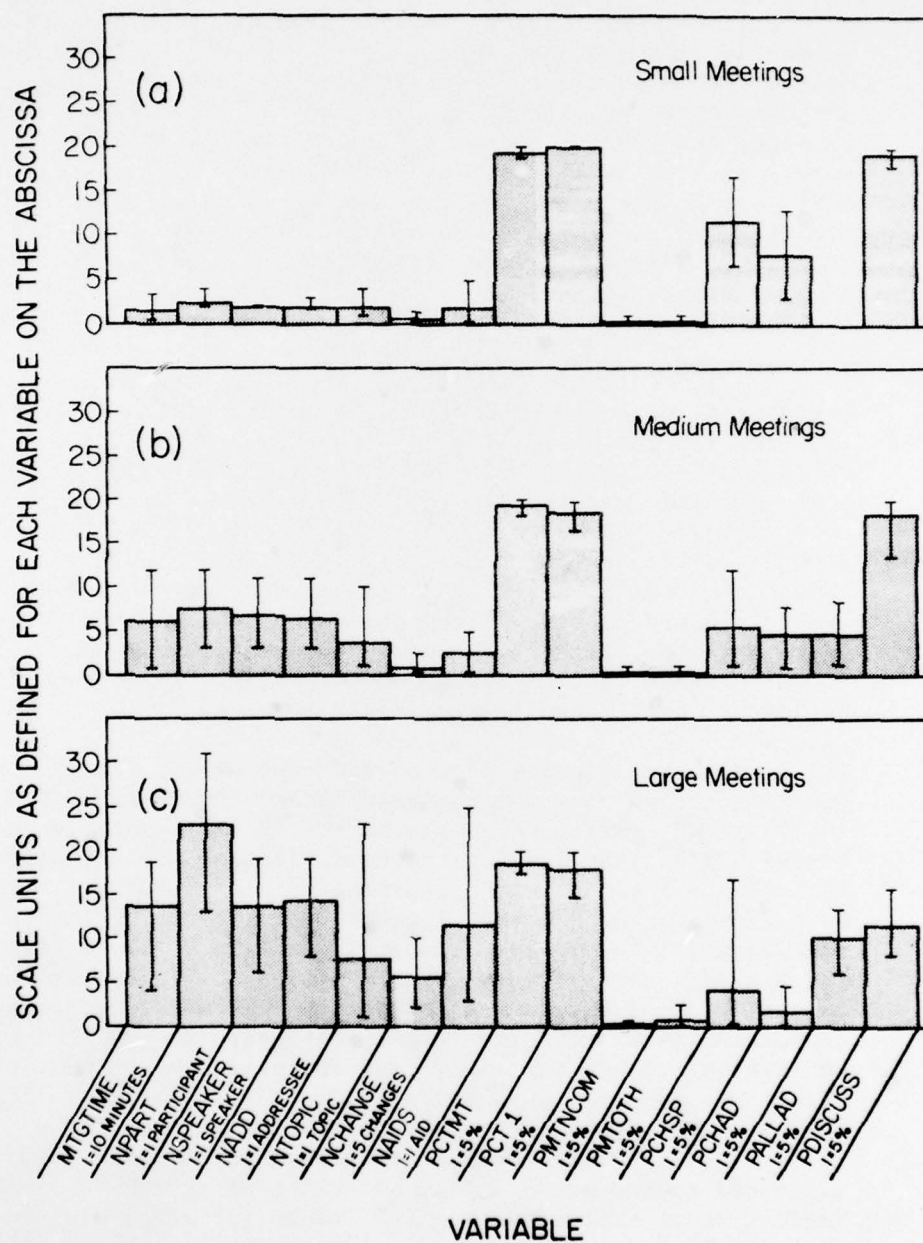


Figure 10. Fifteen-variable profiles for small, medium, and large meetings.

The third and final cluster encompasses the next seven meetings, G3, G5, G10, G11, B14, B8, and B7. These are the very large meetings. They are still longer and include more people, more topics, and more aids than even the medium-sized meetings (Figure 10(c)).

The remaining ten meetings are unique in that they are not consistently like meetings in any of the three clusters. For example, most of these meetings were large in the sense that many people attended them but all but two had levels of interactive discussion that exceeded the level typical of "large" meetings. In this respect they were more like "small" or "medium" meetings. Similarly, the one "smaller" meeting among the ten (A6) between a faculty advisor and a graduate student had an incidence of participant movement that was so high (NCHANGE = 23), it is more typical of a "large" meeting. Due to other, similar discrepancies, the meetings, A6, A9, A16, B1, B12, B15, G2, G6, G9, and G14, are not readily assigned to any one of the three clusters.

More detailed comparisons among the 31 small, medium, and large meetings can be made from the descriptive statistics in Table 45 and from the three profiles in Figure 10. Each of the seven quantity variables (MTGTIME, NPART, NSPEAKER, NADD, NTOPI, NCHANGE, and NAIDS) increases with meeting size, while six of the eight percentage variables (PCTMT, PCT 1, PMTNCOM, PCHSP, PCHAD, PDISCUSS but not PMTOTH or PALLAD) decreases with size. For example, the proportion of meeting time spent communicating (PCTMT) decreases as meeting size increases due to a corresponding increase in other meeting activities (PMTOTH). The proportion of single, nonsimultaneous conversations (PCT 1) also decreases in larger meetings due to an increase in simultaneous conversations (not shown in the figure).

The substantial decreases in the proportion of communication time associated with the chairman/leader (PCHSP and PCHAD) as meetings get larger is worthy of note. As the number of people increases, it is reasonable that less of the communication would center on any one individual, including the chairman, but this need not necessarily be so. Depending upon the influence and dominance of the chairman/leader role, a majority of the communication might still be directed toward the chairman even in very large meetings. This appears not to be the case since the chairman/leader both speaks and is addressed a lesser proportion of the time in larger meetings. His control of the communication process is simply less obvious although not necessarily less effective.

The dramatic increase in the proportion of communication addressed to the group as a whole (PALLAD) as meetings get larger is indicative of the increasing shift from interactive discussion (PDISCUSS) to one-way presentations in the larger meetings. This may indicate that these larger meetings tend to be more structured and formal than small meetings in which conversation is more equally balanced among participants and is directed to individuals rather than to the

Table 45
Descriptive Statistics for Small,
Medium, and Large Meetings

Meeting type	Mean	Standard Deviation	Minimum	Maximum
MTGTIME				
Small	16.29	11.21	2.0	34.0
Medium	66.06	29.61	7.0	119.0
Large	135.29	46.13	41.0	185.0
NPART				
Small	2.3	.76	2	4
Medium	7.6	3.02	3	12
Large	23.1	6.47	13	31
NSPEAKER				
Small	2.0	.00	2	2
Medium	6.9	2.74	3	11
Large	13.7	4.27	7	19
NADD				
Small	2.1	.38	2	3
Medium	6.5	2.60	3	11
Large	14.4	3.41	8	19
NTOPIC				
Small	2.0	1.15	1	4
Medium	3.9	3.16	1	10
Large	7.7	8.42	1	23
NCHANGE				
Small	3.3	2.69	0	7
Medium	4.7	3.79	0	13
Large	29.6	13.90	11	51
NAIDS				
Small	1.9	1.86	0	5
Medium	2.4	1.80	0	5
Large	11.7	9.07	3	25

Table 45 (concluded)

Meeting type	Mean	Standard Deviation	Minimum	Maximum
PCTMT				
Small	.9772	.0253	.9412	1.0000
Medium	.9793	.0217	.9194	1.0000
Large	.9410	.0472	.8709	.9934
PCT 1				
Small	1.0000	.0000	1.0000	1.0000
Medium	.9456	.0527	.8378	1.0000
Large	.9031	.0804	.7425	1.0000
PMTNCOM				
Small	.0144	.0207	.0000	.0541
Medium	.0139	.0141	.0000	.0522
Large	.0069	.0056	.0000	.0163
PMTOTH				
Small	.0084	.0222	.0000	.0588
Medium	.0053	.0140	.0000	.0569
Large	.0468	.0461	.0000	.1292
PALLAD				
Small	.0000	.0000	.0000	.0000
Medium	.2490	.1208	.0794	.4220
Large	.5151	.1337	.3144	.6780
PCHSP				
Small	.5909	.1916	.3438	.8462
Medium	.2859	.1668	.0522	.5984
Large	.2115	.2939	.0000	.8442
PCHAD				
Small	.4091	.1916	.1538	.6562
Medium	.2491	.1035	.0667	.3945
Large	.0988	.0719	.0000	.2288
PDISCUSS				
Small	.9838	.0429	.8864	1.0000
Medium	.9238	.0926	.6691	1.0000
Large	.5895	.1403	.4195	.7908

group. Uni-directional presentations directed toward all group members probably is a more efficient means of communicating information to a large number of people. It need not, however, be the most effective.

In comparing the small, medium, and large meetings, it is evident that there is a dramatic increase in variability for nearly all the variables as meeting size increases. Obviously, the larger meetings are much less alike than are the small meetings.

Group by Type interaction. When group differences are considered for the 31 meetings that can be classified by type (small, medium, or large), no government meetings are included among the small meetings nor are there academic meetings among the large ones. The following two-way table shows the frequency of academic, business, and government meetings of each type:

<u>Group</u>	<u>Meeting Size</u>			<u>Sum</u>
	<u>Small</u>	<u>Medium</u>	<u>Large</u>	
Academic	3	7	0	10
Business	4	4	3	11
Government	<u>0</u>	<u>6</u>	<u>4</u>	<u>10</u>
Sum	7	17	7	31

This suggests the possibility of a Group by Type interaction among meetings. MANOVA analyses of the 15 variables were used to test the main effect of type and to retest the effect of group on this subset of meetings. The type main effect was highly significant for tests of both the first and second roots, $F = 14.714$ and 5.501 , $df = 30/28$ and $14/14.5$, respectively with $p < .001$ in both cases. This is not surprising since the three sets of meeting types were partitioned by the cluster analysis to optimize inter-type variability.

What is interesting is that the three types of meetings are not equally different from each other. Medium-sized meetings are more nearly similar to small meetings than to large meetings. This can be seen in Figure 11 where the three types of meetings are plotted in the two-dimensional discriminant space. In this figure, the two axes represent the discrimination among the three groups that is possible with the first and second discriminant functions generated by MANOVA. Clearly, the small- and medium-sized meetings are less well discriminated from each other on the first discriminant function, i.e., they are closer to each other than to the large meetings. The large meetings are quite discriminable and so are quite distinct. This difference between the three types of meetings is evident to a lesser extent

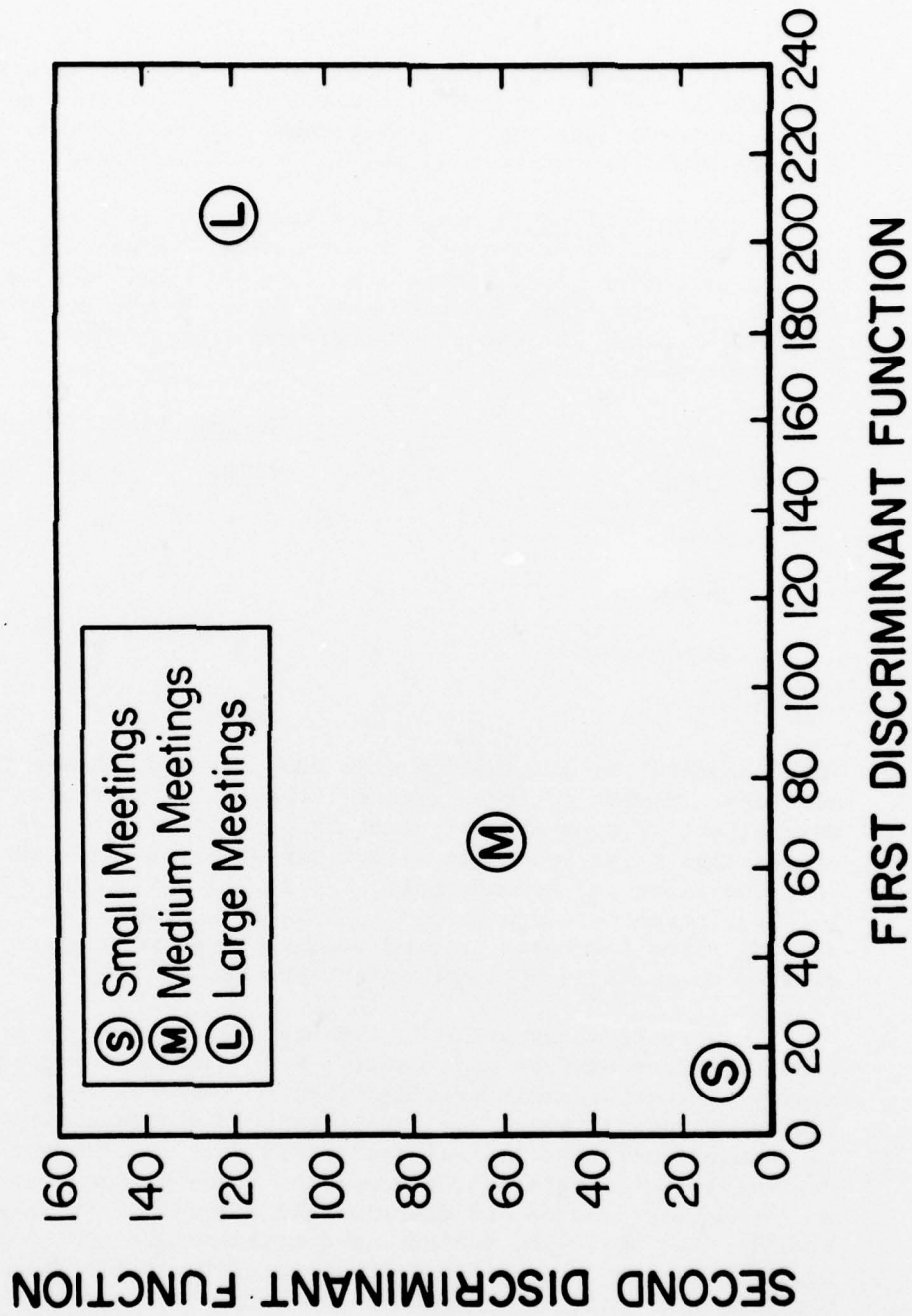


Figure 11. Plot of discriminant space for small, medium, and large meetings.

in both the cluster analysis where the small and medium meeting clusters are less distant than is the large meeting cluster (see Figure 9) and in the composite profiles of Figure 10.

Continuing with the MANOVA, group differences were non-significant for this subset of meetings as they had been for the meetings as a whole, $F = 1.786$, $df = 30/28$, $p < .063$. It was thought that by excluding meetings that could not be assigned to a specific type, some of the random variability among meetings might be reduced and previously undetected group differences might be revealed. Such was not the case. There were still no statistically significant differences among academic, business, or government meetings.

The absence of meetings in two of the Group by Type classifications (small-government and large-academic) precluded use of MANOVA to test the interaction. Hand computations based on the means of the 15 variables for each of the nine Group by Type classifications (see Table 46) indicated no consistent interaction effect other than that due to the absence of the two noted Group by Type classifications.

Type-specific use of communication aids. Table 47 shows the percentage of small, medium, and large meetings in which supplemental communication aids of various types were used. Despite the small sample on which the data are based, a pattern of differential use is evident. As the size of the meetings increased the use of documents also increased. Documents were used in 57 percent of the small meetings, 65 percent of the medium meetings, and in all of the large meetings. In contrast, handwritten notes, used in 43 percent of the small meetings, were used in only one medium-sized business meeting and in no large government meetings. Charts and posters, films, and vu-graph projections were used exclusively in the larger meetings presumably because of the efficiency in conveying information to the large numbers of people present. The size of the meeting seems to have some influence on how information will be conveyed both in terms of the supplemental aids chosen and the style of presentation, unidirectional presentations being more common than interactive discussions.

Table 46
Variable Means for the Three Types of Academic,
Business, and Government Meetings

Type of Meeting	N	MTGTIME	NPART	PCTMT	Variable			
					PCT 1	PMTNCOM	PMTOTH	NSPEAKER
								NADD
Academic								
Small	3	14.833	2.000	.975	1.000	.025	.000	2.000
Medium	7	82.071	8.571	.970	.959	.015	.012	7.714
Large	0	.000	.000	.000	.000	.000	.000	.000
Business								
Small	4	17.375	2.500	.979	1.000	.006	.015	2.000
Medium	4	61.500	7.000	.974	.924	.022	.002	6.500
Large	3	155.000	19.000	.957	.868	.009	.034	13.333
Government								
Small	0	.000	.000	.000	.000	.000	.000	.000
Medium	6	39.083	6.833	.993	.945	.007	.000	6.617
Large	4	120.500	26.250	.929	.929	.005	.056	14.000

Table 46 (concluded)

Type of Meeting	N	Variable					
		PALLAD	PCHSP	PCHAD	PDISCUSS	NTOPIC	NCHANGE
							NAIDS
Academic							
Small	3	.000	.582	.418	.962	1.000	4.000
Medium	7	.319	.287	.259	.913	4.571	5.143
Large	0	.000	.000	.000	.000	.000	.000
Business							
Small	4	.000	.598	.402	1.000	2.750	2.750
Medium	4	.112	.390	.272	.985	3.000	2.750
Large	3	.498	.098	.048	.629	1.000	18.667
Government							
Small	0	.000	.000	.000	.000	.000	.000
Medium	6	.259	.215	.233	.896	3.667	5.500
Large	4	.528	.296	.137	.560	12.750	37.750

Note. Data based on the 31 type-specific meetings.

Table 47

Percentages of Small, Medium, and Large Meetings in which
Various Supplemental Communication Aids Were Used

Type of aid	Type of meeting		
	Small ^a	Medium ^b	Large ^c
Document	57.1	64.7	100.0
Handwritten note	42.9	5.9	.0
Blackboard	.0	.0	.0
Chart, poster, schema	.0	5.9	57.1
Audio recording	.0	5.9	.0
Film	.0	.0	14.3
Vu-graph	.0	.0	14.3
Slide presentation	.0	.0	.0
Video tape	.0	.0	.0
Other aids	28.6	11.8	42.9

Note. Data based on the 31 type-specific meetings.

^aNumber of small meetings = 7.

^bNumber of medium meetings = 17.

^cNumber of large meetings = 7.

Discussion

This paper gives descriptive information about a variety of face-to-face meetings. For the most part, the data and the understanding they provide about meetings as communication phenomena have been discussed individually in the Results section. Some of the more important findings are drawn together in this section under the headings: General Characteristics of Face-to-face Meetings, Use of Supplemental Communication Aids, Differences Among Meetings, and Inaccuracy of Participant Self-report Questionnaire Data. Throughout, relevant teleconferencing design considerations and recommendations are discussed.

Before summarizing those results, some comments about the scope, generalizability, and methodological limitations of this study are necessary. First, the sample of meetings that was studied does not represent the population of face-to-face meetings in general. The sheer number and diversity of meetings and conferences that occur in the world required that meetings chosen for observation be restricted to a more limited and, hopefully, more homogeneous sample that could be studied in detail. As a result, observations were limited to academic, business, and government meetings to the exclusion of other, perhaps equally interesting groups of meetings such as those conducted by service and civic organizations, the medical profession, the military, and even social clubs. The meetings that were studied therefore represent a highly select sample of all face-to-face meetings.

Second, it was possible to sample only 16 meetings from each of the three groups of meetings. Despite the quantity and detail of data collected from each meeting, it is unlikely that data from so few meetings adequately represents the diversity of meetings in any of the three groups and even less likely that, together, they represent face-to-face meetings in general. Furthermore, the small sample sizes undoubtedly contributed to the repeated failures to detect differences among the three groups of meetings. Because meetings within each group differed so much from one another (as evidenced by high internal variability), between-group differences, if they existed, were statistically undetectable with such small sample sizes.

Third, the meetings are not a random sample of the three groups because the populations of academic, business, and government meetings are unknown, and because meetings could be observed only with prior permission of the conferees. Consequently, meetings were selected largely on the basis of availability and the resulting sample may be

biased against unscheduled and confidential meetings to which access was less readily obtained. The probable likelihood that those types of meetings are under-represented in the sample must be considered when assessing the representativeness of the data.

None of these selection problems directly affect the validity of the data that were collected but they do limit the extent to which the data can be generalized to face-to-face meetings outside this sample. Careful consideration should be given to the limitations imposed by the smallness of the sample, its restrictive scope, and its non-random composition before these findings are applied in other contexts.

Similar cautions need to be raised with regard to possible biases attributable to the data collection instruments that were used in this study. Problems with the validity of the self-report questionnaire data have been documented previously and will be further elaborated later in this section. The objectivity of the behavioral coding scheme used to collect observational data may also be questionable since several sources of possible bias can be identified.

First, meeting behaviors and activities were observed and recorded at 30-second intervals. Justifications for selecting this sampling rate have been given previously (see p. 13), but it is entirely possible that this rate may not have been sufficiently frequent to document accurately rapidly changing meeting activities. If so, activities that lasted less than the 30-second inter-observation interval are probably under-represented compared to other, more enduring meeting activities. The magnitude of this possible distortion was not tested explicitly. It is suggestive however that only minor changes in the proportions of time devoted to various meeting activities were found when data collected at a less frequent 60-second interval were compared to those based on the 30-second interval that was used in this study. This, of course, does not imply that there would likewise be no major differences if observations had been made more frequently, for example, every ten seconds, but it does suggest that the exact sampling rate may not be especially critical. Thus, the decision to use a 30-second sampling rate in this study was probably an adequate compromise between sampling adequacy and observer workload.

Second, the observational recording technique may have been subject to observer bias in interpreting and recording meeting events, and to loss of data through observer inattention and overload. Previous documentation of the ease with which the behavioral coding scheme was used suggests such bias was not a major problem (see p. 16), although there were instances in which the observer was unable or incapable of providing particular kinds of information about the meeting process. These instances, although infrequent, seem to be largely a consequence of the observer's unfamiliarity with the meeting being observed. The observer could record what was occurring at the meeting without much

trouble; it was much more difficult to infer why something occurred or what its significance to the meeting process might have been. For example, as an outsider, the observer was frequently unable to specify meeting purposes or objectives, to determine how particular communication interactions contributed to those objectives, or to state whether those objectives were resolved during the meeting. Obviously, objective observation is not totally adequate as a source of information about complex phenomena like the meetings in this study and should be supplemented with complementary data collection strategies if possible.

Last, the presence of the observer in the meeting room undoubtedly had some effect on meeting participants and the meeting process. Despite evidence that this disruption was minimal (see p. 83), the observer's potential for influencing the meeting is a serious concern and one that must be balanced against the advantages to be gained from this type of data collection methodology.

The extent to which these methodological factors have distorted the data collected in this study is unclear. Therefore, these potential biases and the limitations of scope and generalizability mentioned earlier should be kept in mind throughout the following discussion. The results and findings that are discussed apply to the particular sample of meetings in this study and may or may not generalize directly to other groups of face-to-face meetings or to teleconferences.

General Characteristics of Face-to-face Meetings

The variability of the data collected for this sample of meetings would seem to suggest that there may be no such thing as a prototypical meeting. Still, certain consistencies emerged as important characterizations of this sample of meetings.

Meetings in general. Most of the meetings observed in this study were organized activities that had been planned well in advance. Over 90 percent of the participants knew days, weeks, or even months in advance when their meeting was going to be held. In particular, the large, official meetings seemed to have been scheduled long before the meeting date. Only 17 percent of the observed meetings were unscheduled, impromptu meetings about which participants had little or no advance notice. Due to their spontaneous nature, meetings of the latter type were difficult to identify with sufficient lead time to permit observation (despite special efforts to do so, see p. 17) and probably are under-represented in the overall sample of meetings.

Typically, participants from this sample of meetings did not have to leave the building in which they worked in order to attend their meeting and most required no more than 10 minutes to get to the meeting site. Only a few had to travel long distances in order to participate in a meeting. Consequently, most participants rated their meetings as very convenient to attend. Coincidentally, nearly one

quarter of the participants claimed to have been able to combine some activity that was unrelated to the meeting itself, e.g., meeting with other people, or running errands, with their visit to the meeting site. Thus, they took advantage of the situation to "kill two birds with one stone."

The lengths of the meetings varied greatly. The median length of meeting was just a little over one hour but some meetings were extremely brief (less than two minutes) and others were nearly five hours long. There was some regularity, however, about the times of day when meetings were scheduled to begin. The most common times for scheduling meetings (due either to preference or custom) were mid-morning (9:30 a.m.) and mid-afternoon (2:00 to 3:00 p.m.). Few meetings were scheduled early in the morning, at noon, late in the afternoon, or in the evening (see Figure 4).

The observation that scheduled starting times were unevenly distributed over the hours of the day and that, as a result, meetings did not occur with equal frequency throughout the day, suggests that peak demands may be placed on conference facilities (meeting rooms, projection facilities, support personnel, etc.). If so, there sometimes may be too few available facilities to accommodate all those who want to meet at a particular time. The popularity of certain meeting times, e.g., 9:30 a.m. and 2:00 p.m., might also require individuals to choose among two or more meetings scheduled for the same or nearly the same time. This, in fact, happened in at least one meeting, G7, in which the group chairman was unable to be present because he had to attend another meeting. Consequently, his assistant presided in his place. What effect this substitution might have had on that meeting is not known, but conceivably the necessity for choosing among simultaneous meetings and for coping with inadequate facilities if peak demands are generated could affect the meeting process. In any case, this point warrants further investigation.

The tendency for meetings to be scheduled at similar times during the day could present even more serious problems if a single telecommunications facility or studio had to be shared among several different user groups. Advance scheduling would be crucial to avoid conflicts and quite possibly some meetings might have to be scheduled at less desirable or less convenient times in order to accommodate all system users. In that event, a system of meeting priority would be required to ensure equitable scheduling.

An even more obvious scheduling problem was the frequency with which meetings failed to start on time. As noted on page 29, 39 of the 40 scheduled meetings started late and many were delayed relatively long periods of time. These delays could cause serious problems when meetings are to be teleconferenced. Most teleconferencing systems are used by several different departments within a single organization or are shared among several different organizations. As a result, the system is available only on request and a limited amount of

telecommunication transmission time is allocated to each group for a specified period of time. Only during this time is it possible to interact with participants at the other end of the telecommunication link. Any delay in starting at the scheduled time is a waste of expensive communication time. To make matters worse, teleconferenced meetings of this type must stop at the end of the allotted time regardless of whether the business of the meeting has been concluded in order that others may use the system. Unlike face-to-face meetings, teleconferences conducted under these constraints cannot run over to compensate for an initial delay. This obvious difference between the relatively free manner in which face-to-face meetings typically seem to be conducted and the rigid time constraints imposed by some teleconferencing systems presents designers with a dilemma--should teleconferencing systems be made more flexible, or should conferees adapt to the constraints of the system? Although the former seems preferable from a human standpoint, it is also a much more expensive solution.

When asked to evaluate their meetings on several qualitative dimensions, participants stated that, in general, their meetings had dealt with moderately urgent matters that were of moderate to high importance and that were typically of a non-confidential nature. The apparent non-confidential nature of most meetings may be the result of sampling bias that precluded the observer from attending highly confidential meetings. Quite likely, meetings at which confidential matters are discussed are under-represented in this sample.

Although most participants responded that their meeting had been quite effective in addressing its objectives, the observer noted that about one-fifth of the meetings (19%) lacked adequate information to reach a decision or to take some action during the course of the meeting (see p. 32). This most often occurred when participants were unable to provide requested information from information sources available to them at the meeting. As a result, participants proceeded without the information, postponed the decision until a later date, or actively sought to obtain the information by telephoning external information sources or by leaving the meeting room to obtain the required information.

Whether these deficiencies in information could have been anticipated and so avoided by more thorough participant preparation or whether they were spontaneously generated during the course of the meeting is not possible to determine. In either case, it is important to recognize the reasonable probability that additional, outside information will be required in some meetings and that some provision for obtaining that information, e.g., conference room telephones, support staff, or computerized information retrieval systems, should be provided for participant use. These information support provisions may be particularly important in teleconferenced meetings due to the previously noted time constraints under which many teleconferences operate.

Coffee and luncheon breaks were unexpectedly frequent in face-to-face meetings. Several meetings recessed at mid-morning for a brief coffee break before resuming business. In addition, several meetings that had begun in the morning and were to continue during the afternoon recessed for lunch. The frequency of both types of break in face-to-face meetings raises an interesting question of if, and if so, how, these services might be coordinated and provided in teleconferences when participants are geographically separated. The complications imposed by differing time zones, separate food preparation facilities, and even regional or national food preferences and tastes stress the importance of preplanning and organization when meetings are teleconferenced.

Surprisingly, luncheon breaks did not entirely break the continuity of meetings in which they occurred. In two instances, for example, the participants (as well as a grateful and hungry observer) were served a catered luncheon in the meeting room itself. The conferencing facility in which these meetings were held had its own food preparation area especially for that purpose. While these meetings officially adjourned for lunch, it was obvious that much of the discussion during the luncheon break was pertinent to the morning's discussion and that in a sense the meeting process was continuing even during lunch.

Despite the continuity mentioned above, the observer did note a change in emotional context in one meeting before and after lunch. In that meeting, interactions had become quite heated just prior to lunch. Tempers had flared, voices had been raised, and in general, participants had become generally argumentative. Following lunch, the atmosphere of the meeting returned to the calmer and less contentious interactions of earlier in the morning. Somehow the luncheon break had altered the emotional course of the meeting and redirected it to more cooperative exchanges.

A last observation about the general meeting process is the overwhelming tendency for participants to get up and move around during meetings in order to change seats, converse with participants on the other side of the room, distribute handouts, or leave the meeting room. The frequency of these participant movements clearly demonstrates that participants do not sit passively in one spot during a meeting. For example, one participant moved about a total of 26 times in the same meeting. Another never sat down. Instead, he stood or wandered about during the entire meeting. Yet, sitting passively is exactly what is required of teleconferenees in most video conferencing systems. Conferenees must remain in their assigned seats and stay within the field of view of the video camera in order to be seen by participants at the other end of the telecommunication link. If they do not, and these data suggest they are not likely to, they frequently will be off-camera unless provision is made to follow their movements. Again, characteristic human behavior in face-to-face meetings appears to conflict with teleconferencing system requirements.

Participant interactions. Interpersonal communication unquestionably played a vital role in face-to-face meetings. Ninety-three percent of the meeting time on the average involved some form of communication. For the most part, interactions among participants were devoted to the exchange and discussion of factual information with the result that 82 percent of all interactions were factual statements or responses. Although the extent to which these factual interactions contributed to the meeting objectives was not (and probably could not have been) assessed by the observer, the fact that less than three percent of all communication time was taken up by social or non-task related interactions suggests that face-to-face meetings are highly directed, purposeful activities in which participants attend to the business at hand.

The communication interactions observed among participants were almost entirely oral in nature. To be precise, 97 percent of all interactions were entirely oral; an additional two percent were in part oral. Despite the importance that many teleconferencing system designers attribute to written and gestural communications, these mediums of communication accounted for an insignificant proportion of all communication interactions and were almost always accompanied by oral elaboration.

Of course, the infrequent use of non-oral modes of communication does not necessarily reflect their lack of importance or criticality to the communication process. Nevertheless, the highly oral nature of communication in these meetings suggests that primary attention might reasonably be given to this medium of communication in the design of teleconferencing systems. The heavy reliance on oral communication in face-to-face meetings also suggests that in many instances less costly audio telecommunications links may be more than adequate substitutes for combined audio-video links.

As might have been anticipated, participants did not contribute equally to the communication process. The degree of inequality, however, was unexpected; most of the communication interactions in meetings were initiated by and addressed to a very few participants. Even in large meetings where there were many potential communicators, a relatively small number of participants dominated the communication process (see p. 36). The chairman or leader of the group often was included among this select group of interactive participants, probably because of his responsibility for directing the meeting. In contrast to this group of highly interactive individuals, some people attending meetings did not interact at all. Instead, they constituted a passive audience and took no active part in the meeting. Such non-interactive groups were typically observed at very large meetings that were attended by many people. The failure of these individuals to involve themselves in the meeting interactions appeared to be intentional on their part. The observer was aware of no deliberate attempts by the interactive few to restrict interactions by other members.

Teleconferencing system researchers have sometimes argued for the need to give conferees the option of speaking privately with other conferees. This can be done in a teleconferencing system by providing special microphone cutoffs or "cough buttons" that allow confidential side conversations or by providing conferees with private audio links. The importance of private communications was not apparent in the meetings observed in this study. Private interactions among participants occurred so infrequently and accounted for so little of the total communication time (.3 to 8%, see p. 39), that their importance appears to be overestimated. Of course, infrequency need not imply a lack of importance. Still, extensive efforts to provide this type of interactive capability may not be justified by overwhelming need.

Use of Supplemental Communication Aids

The extent and nature of the use of supplemental communication aids was a major focus of this study. Much teleconferencing system research has been devoted to the development of special graphics cameras, remotely activated blackboards, and other kinds of hard-copy facsimile devices that would allow teleconferees to use various kinds of audio-visual aids much as they would in a face-to-face meeting. A major concern is whether the frequency with which these aids are used in face-to-face meetings justifies the expense of developing and providing these specialized capabilities. An additional concern is whether the transmission devices being developed are appropriate for the types of supplemental communication aids that are commonly used in face-to-face meetings. Definitive responses to those concerns are not yet possible but the data collected in this study provide some baseline knowledge about how audio-visual aids are used in face-to-face meetings.

As noted on page 47, supplemental aids were used in most meetings (88%) and oftentimes several aids were used in the same meeting. Detailed discussion of the nature of that use and implications for teleconferencing has already been presented in the section entitled Supplemental Communication Aids (p. 54ff). Special considerations generated by the relatively frequent use of unconventional, other aids such as wall-sized maps, books and pamphlets, computer print-outs, scale models and pieces of equipment, and photographs are discussed on page 58. Accommodating the use of such a diverse collection of audio-visual aids in teleconferenced meetings may require some rethinking of how to convey these types of information in other than a face-to-face configuration. Certainly, available techniques and devices do not appear to be adequate to handle the diversity of the non-conventional aids observed in this study. Nor can their use be ignored or written off since these other aids comprised 19 percent of all aids used in this sample. Their very uniqueness may make them especially critical to the successful exchange of information in meetings in general and thus essential to the communication process. Future research will have to assess the functional importance of specific supplemental communication aids if sound design decisions are to be made about the use of such aids in teleconferences.

Differences Among Meetings

One of the main reasons for observing a variety of meetings within the academic, business, and government sectors was to identify ways in which meetings differ from one another. At the same time an attempt was made to identify commonalities that held for certain classes of meetings. In particular, it was hypothesized that meetings would differ as a function of: (1) the type of group conducting the meeting, i.e., whether participants were predominantly from the academic, business, or government environment, and (2) the purpose for which the meeting was held. Neither hypothesis was supported.

Group differences. For the most part, academic, business, and government meetings were very much alike. A multivariate analysis of variance of 15 selected meeting variables revealed no differences among the three groups. When all 68 of the behaviorally observed dependent variables were tested individually, only two differed significantly. Those two were both related to participant movement during meetings and differed only between academic and government meetings. The differences are most likely related to the slightly greater average number of people at government meetings and the resulting greater probability of participant movement in those meetings.

Responses by the three groups of meeting participants to the questionnaire were also very similar. The only substantive differences were that: (1) government and business participants travelled farther and longer to attend their meetings and so rated their meetings somewhat less convenient to attend, and (2) government participants tended to rate their meetings slightly more important than did business or academic participants.

To a limited degree, the use of some supplemental communication aids also differed among the three groups. For example, blackboards were used only in academic meetings; films, slides, and vu-graphs only in business and government meetings. Charts were more frequently used in business meetings; non-conventional, other aids more frequently in government meetings. Other types of aids, notably documents, were used in much the same ways and for the same purposes by participants in each of the three groups.

Purpose of meeting. It proved to be impossible to compare meetings conducted for different purposes because most meetings did not have single purposes. The number of different meeting purposes that were given by participants in the same meeting indicated instead that most meetings served multiple purposes. Although some purposes were participant specific, participants did not merely disagree on the meeting's purpose. Rather, the same individual often listed several different purposes as applying equally to the meeting. Since meetings could not be classified by a unique purpose, further analysis was not possible.

The common assumption that meetings are conducted for some particular purpose appears to be faulty. If so, recent efforts by teleconferencing researchers to determine which of several alternative modes of teleconferencing (audio, audio-video, computer-mediated, etc.) is more appropriate for meetings with particular objectives or purposes may be misdirected. The present research suggests that the purpose of a meeting is a multi-dimensional characteristic whose relation to any particular meeting is as yet unclear.

Nonetheless, some meeting purposes were more common than others. Among these were discussion, planning, administration, presentation, and review.

Differences due to size or type of meeting. Meetings could be differentiated from one another on the basis of meeting size or rather, a composite characteristic of meetings that can best be referred to as size. Principal component analysis of 15 selected variables indicated that a composite of those variables that were related to the size and complexity of meetings accounted for 31 percent of the differences among meetings. This size/complexity dimension suggests that small meetings were qualitatively as well as quantitatively different from large meetings. Cluster analysis supported this conclusion by identifying three distinct types of meetings--small, medium, and large--that differed along a nearly identical size/complexity dimension. As meetings got larger, complexity increased. The three types of meetings varied primarily in the length of the meeting and the numbers of participants, speakers, addressees, topics, changes in location, and aids, each of which increased as meetings got larger. Conversely, the proportion of the meeting spent communicating, the proportion of interactive discussion, and the proportion of chairman and leader control decreased as meetings got larger. On all these characteristics medium-sized meetings were more similar to small meetings than to large meetings.

The identification of size as a distinguishing characteristic of meetings replicates the findings of a study by Pye (1972) in which he factor analyzed a set of variables that had been used by several different researchers to describe meetings. Meeting size was the single most important factor that could be used to describe meetings of various types. Pye concluded that the more individuals that were involved in a meeting, the more they talk, the more difficult it is to arrange the meeting at short notice, and the greater the necessity for holding it face-to-face rather than by teleconferencing modality. Pye's conclusions are not very different from those reported here. In both studies, meeting size seems to be a critical feature of face-to-face meetings that can be used to describe many diverse aspects of those meetings.

Predicting meeting characteristics from anticipated meeting size. The desirability of identifying the communication requirements of a particular meeting should be apparent. If the communication needs

are known, appropriate teleconferencing facilities can be provided to accommodate those needs. The problem is to identify some distinguishing characteristics of meetings that can be used to categorize meetings and specify specific communication requirements. Unfortunately, group and purpose distinctions appear to be relatively useless in this regard. Furthermore, meeting size, the one characteristic that did differentiate among meetings, can be specified only after the meeting begins. Values for the 15 variables used to classify meetings into size types are not known prior to the meeting. For example, only after the meeting is over can meeting length and number of participants be determined. Therefore, knowing that the size of a meeting is an important predictor does not appear to be of much practical use in anticipating communication requirements in those meetings.

The possibility exists, however, for estimating meeting size and related characteristics indirectly. It is often the case that the number of people invited or obligated to attend a meeting is known in advance of the meeting and may be a reasonable estimate of the number of people who will actually be present at the meeting (NPRES). Furthermore, there is a high positive correlation between the variables NPRES and NPART ($r = .80$, $p < .001$) and that high degree of association is potentially useful. Since NPART had a dominant effect on size classification (as evidenced by the high loading for NPART in the principal component analysis), it may be that the estimate of NPRES derived from scheduled attendance or invitations could be used in place of NPART to predict the size of an upcoming meeting.

To test this possibility, a correlation between values of NPRES and categorical classifications of meeting size--small, medium, and large--was computed. To do so, the three meeting categories were scaled proportionate to their inter-group distance in the first discriminate space (generated in the MANOVA analysis). The resulting quantifications of size (small = 15.28, medium = 65.30, large = 206.81) were assigned to each meeting within the respective groups and then paired with the appropriate values of NPRES for those meetings. The resulting Pearson product-moment correlation between NPRES and the three types of meetings was .83, indicating a high degree of association. Thus, to the extent that the anticipated number of people is a good approximation of NPRES, that number might be used to make indirect estimates of several other meeting features based on their observed correlation with the variable NPRES. These variables and their associated correlations are summarized below for the 15-variable subset:

	<u>r</u>		<u>r</u>
NPRES with MTGTIME	.32	NPRES with PCTMT	-.15
NPART	.80*	PCT 1	-.44
NSPEAKER	.60*	PMTNCOM	-.44
NADD	.62*	PMTOTH	.16
NTOPIC	.29	PCHSP	-.08
NCHANGE	.67*	PCHAD	-.52
NAIDS	.37	PALLAD	.68*
		PDISCUSS	-.78*

*
p < .001

The seven highly significant correlations (indicated by asterisks) suggest that if many people are expected to attend a meeting with the result that NPRES will be large, then the meeting may be predicted to have all the characteristics of a large meeting. That is, there will be many participants, many speakers, and many addressees. The speakers will tend to address themselves to the group as a whole rather than to the chairman and there will be little interactive discussion among members. It is also probable that participants will move around a great deal during the meeting. Although the relationships are less strong, the meeting is also likely to be lengthy, to involve the discussion of several topics, and to include the use of numerous communication aids.

Admittedly, this is a roundabout way to predict the characteristics of a particular meeting. It seems, nevertheless, to be the only available means of doing so in the absence of a more complete understanding of how meetings differ.

Further observations. Despite the similarities among academic, business, and government meetings on nearly all the variables tested in this study, some potential differences, especially between business and government meetings, were apparent to the observer. Because he was in a unique position to get a comprehensive overview of the meeting, the observer was able to form hypotheses about differences among meetings and about characteristics of meetings in general that were neither anticipated nor apparent from other data collection instruments. These observations are entirely subjective impressions, but they do suggest new aspects of meetings that need to be examined more thoroughly,

especially since most could have profound implications for teleconferencing. The present data, unfortunately, do not permit such an evaluation and so the observations are reported only as points of interest.

First, the level of participant sophistication seemed to differ between business and government meetings. Conferees at business meetings tended to be quite familiar with the meeting process, they met regularly, they usually knew one another, and they knew what they individually had to contribute to the meeting's purpose. In contrast, government meetings often involved members of the general public who did not attend regularly and who were not knowledgeable about how the meeting functioned or what their role in the meeting should be.

The implication for designing teleconferencing systems for government meetings is clear. Unlike most present systems that require familiarity with, or instructions in the use of the microphones and cameras and other assorted technology needed to conduct teleconferences effectively, systems intended for government use will have to accommodate a much wider range and lower level of participant capabilities and sophistication and should be simpler to use.

A second observation indicated that business and government meetings obtained and used information differently. Business meetings appeared to be information self-sufficient while government meetings were dependent on outside sources of information. In business meetings, all the participants seemed to share equally in contributing information toward the group's purpose. Each, regardless of status, provided part of the information essential to the group's activities.

Members of government meetings, on the other hand, were more often dependent upon sources of information from outside their group. Often experts or staff members familiar with a particular subject, that is, people who were not normally members of the group, were called upon to give a special report that provided the information members needed in order to act.

A third observation was that government meetings and some academic meetings seemed always to be rushed and hurried. Participants in these meetings acted as though they regarded the meetings as an obligation that took time away from doing something else. They often cited busy schedules as the reason for arriving late or leaving early, both of which were frequent occurrences in these meetings. Participants at business meetings, conversely, seemed to regard the meeting and the time required as a legitimate part of their job. There was far less pressure in business meetings to "get it over with so we can get back to our work." Of course, it may also be that business people prefer meeting to working.

Two general observations apply to meetings of all three groups. First, parliamentary procedures, even modified ones, were seldom used.

This was true even for meetings that required group consensus to resolve issues. Most often, approval or consent was merely inferred from the absence of dissent. If no one objected following discussion, the issue was resolved. The process of moving, seconding, and voting a motion was seldom used, and if used, was accomplished in a very haphazard manner. There were no formal roll calls, no tallies of positions; instead, a simple group yea or nay often sufficed.

Second, and the observation made with the most certainty, one meeting quite often led to another. Sometimes, the subsequent meeting was the result of issues that could not be resolved in the prior one perhaps due to lack of information or to disputes among the participants. When this happened, several members would arrange to meet at a later time to resolve that particular problem.

More frequently, subgroups of participants would break into smaller meetings at the conclusion of a formal meeting to continue discussion of some topics or to discuss entirely new ones. The participants seemed to take advantage of the situation to talk to someone with whom they had not previously had the opportunity to talk. These post-meeting discussions often continued for some time and members frequently participated in several different sessions, one after another. This was especially true for the chairman who was often the focus of several such meetings as different groups of individuals, one after another, vied for his attention.

On several occasions, participants stated that these post-meeting discussions were more important and more effective than the formal meeting and that they were essential for getting information and conducting business not appropriate for discussion by the entire group. If this is so, the likely elimination of such informal, selective interaction after a teleconference because conferees would no longer be able to mingle and interact freely could have an important adverse effect on overall meeting effectiveness.

Inaccuracy of Participant Self-report Questionnaire Data

Much earlier in this paper, concern was raised about the accuracy of self-report questionnaire data. As noted, most of the available information about face-to-face meetings is of this type. Since some of the information collected in this study was also based on participant self-report, an attempt was made to test the accuracy of some of that data against more objective observational data. Three of the participant questionnaire items had been included especially for that purpose.

Substantial differences were found between information about the meeting supplied by participants and the same information collected by actual observation (see p. 83). Depending on the nature of the query, about a quarter to half of all participant responses were

inaccurate. Errors of both omission and commission were made although errors of omission were more common. Participants frequently failed to report certain specific details about the meeting itself or about activities that occurred during the meeting. For example, participants often failed to report that a chairman had presided over the meeting or that certain kinds of audio-visual aids had been used. More serious, perhaps, is that they sometimes falsely reported that certain meeting events had occurred when none had been observed. The potentially distorted view of face-to-face meetings that could result from such errors is obvious.

In general, participants more accurately recounted the more conspicuous or salient aspects of meetings. That is, the presence of a chairman at the meeting was more accurately recalled than the use of procedural rules or an agenda. Possible explanations for these discrepancies have been noted previously (see p. 83). Nevertheless, the overall conclusion must be that participants were not very good at recalling objective features of the meetings they had just attended. That conclusion necessarily raises doubts about the validity of self-report data in general.

Unfortunately, the accuracy of participant responses could be determined only for the quantitative questions on the questionnaire. Other questions, related to non-observable aspects of the meeting such as participant attitudes of meeting importance and urgency could not be evaluated because the objective data necessary for comparison were not available. Whether this type of participant-supplied information is more accurately reported than are the quantitative enumerations of meeting events cannot be determined from the present study. Hopefully it is, for if not, much of what is known about face-to-face meetings based on the abundance of self-report data in the literature may be highly suspect. In any case, the present findings suggest that self-report information ought to be evaluated critically and interpreted with care. Preferably, more objective observational data should be sought when crucial design decisions hang in the balance.

Conclusion

Despite their seemingly ubiquitous nature, face-to-face meetings have seldom been the focus of empirical investigation. As a consequence, very little is known about them or about their associated communication processes. This is unfortunate because the lack of such information hampers the development of teleconferencing systems that could be used to substitute for some types of face-to-face meetings. This study provides a source of descriptive information about meetings that is tailored to the need of teleconferencing system designers to have a comprehensive understanding of all aspects of face-to-face meetings. The variables selected, the data collection techniques employed, even the types of meetings observed were chosen because they seemed most likely to provide information about face-to-face meetings that would be relevant to a variety of teleconferencing applications.

Various observational techniques and a participant questionnaire were used to record the behavior of participants and the events that occurred in 48 academic, business, and government meetings. The data that were obtained from a large number of dependent variables provide detailed, descriptive information about these meetings and about their associated communication processes. Among other things, the data document: (1) how and why the meetings were conducted; (2) when, where, and for how long the meetings were held; (3) what the pattern and nature of communication interactions were among participants; and (4) what use was made of supplemental communication aids such as audio-visuals and graphics.

The compilations of these data provide normative descriptions of numerous aspects of face-to-face meetings and of characteristic meeting behaviors that may be useful in making or evaluating teleconferencing system design decisions. One consistent finding seems particularly important. The time and procedural constraints imposed by most teleconferencing systems are inconsistent with the characteristic or typical participant behavior observed in this sample of face-to-face meetings. Participants in these meetings came and went at will, sat and moved around where and when they pleased, and typically did not follow a rigorous time schedule. Most existing teleconferencing systems on the other hand impose a high degree of structure on the meeting process which may conflict with the informality that seems to be characteristic of most face-to-face meetings. If so, the artificial constraints in teleconferences could be disruptive of meeting effectiveness. That possibility warrants additional study to clarify the impact of procedural aspects of teleconferencing on the meeting process.

In addition to documenting various characteristics of meetings in general, the meetings in this study were compared with each other to determine if and how associated communication requirements differed due to: (1) the group conducting the meeting (academic, business, or government), (2) the purpose of the meeting, and (3) the size/complexity of the meeting. Identifying possible differences in the communication requirements of certain classes of meetings is important in terms of being able to anticipate and accommodate differing requirements in teleconferencing situations.

No substantial differences among the three groups of meetings were found. That is, whether a meeting was academic, business, or government had essentially no effect on any important variable tested. However, some subtle but untestable differences among the three groups in the use of information, in participant sophistication, and in participant attitudes were noted by the observer and may warrant further investigation.

It was not possible to compare meetings that were conducted for different purposes because distinct purposes could not readily be assigned to most meetings. Very few meetings were conducted for single

purposes; instead, most served multiple functions. This finding was entirely unexpected and is contrary to previous teleconferencing research that attempts to match teleconferencing facilities to specific meeting objectives. Although the possibility that a meeting may have multiple objectives seems plausible, it clearly needs to be verified by more thorough analysis of participant evaluations of the reasons for which they meet. To do so, it may be necessary to determine the degree to which many different purposes apply to a particular meeting.

Meetings did differ from one another along a size/complexity dimension. Three distinct types of meetings--small, medium, and large--were identified in this sample of meetings and shown to differ in complexity and communication characteristics. The size distinction was of little use in predicting communication requirements for the three types of meetings however, and may be of little practical importance for teleconferencing applications. Nevertheless, the size of a meeting appears to be an important characteristic of face-to-face meetings and one that does influence the meeting process.

Perhaps the most important contribution of this study is the direction it provides for future research on face-to-face meetings. Because there was little previous research to guide the formulation of research objectives, this study was in many respects exploratory. Consequently, meetings were sampled broadly and many different aspects of face-to-face meetings were examined--some by design, others almost by chance. As a result, a number of totally unanticipated meeting features have been identified. Some of these, for example, the observations that chairmen and leaders seem to use rather consistent strategies to organize, control, and direct meetings; that the emotional context or atmosphere of a meeting fluctuates over time; and that one meeting frequently leads to or necessitates another may prove to be important characteristics of meetings that merit further study. The last finding is especially intriguing because it suggests a previously unrecognized continuity among meetings. Rather than viewing meetings as discrete events, it may be more appropriate to consider them to be interrelated elements of a continuing process. This suggests that a longitudinal study of meetings or, more accurately, of a series of meetings might be an effective way of documenting how a topic of discussion originates and moves through the meeting process to final resolution. Some form of network analysis might be useful in this regard for tracing the flow of information and documenting decision points throughout the process.

Intriguing as such an idea may be, it is only one of many new and interesting questions about the face-to-face meeting process that has been generated by this study. A great many more need to be examined before the complexities of the meeting process can be neatly elaborated and applied with confidence to the design of teleconferencing systems. In the meantime, studies such as this one may provide some of the rudimentary knowledge about face-to-face meetings that designers need today.

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Appendix A
Behavioral Coding Scheme for Observing
Face-to-face Meetings

The coding scheme for recording behaviors and events that occur during face-to-face meetings is based on fixed-interval observation. Observations are made every 30 seconds and following each observation, selected descriptive information is recorded in abbreviated form on an observation sheet. This information describes the nature and characteristics of the observed communication interactions, and when tallied and summarized, provides a concise description of what occurred at the meeting.

The observation coding sheet shown in Figure 2 illustrates how the coding system is used. Time intervals marked on the left margin represent each 30-second observation and serve as observer prompts for recording information. Fifteen minutes of observation may be recorded on each side of the observation sheet, and each full hour of observation is recorded on the four consecutive sides of a pair of observation sheets, i.e., minutes 1-15, 16-30, 31-45, and 46-60. The actual hour of observation, e.g., 10:00 a.m., is entered on each sheet above the time interval column.

The nine column headings to the right of the time intervals refer to categories of information recorded following each observation. These categories of information, # of On-going Conversations, Speaker, Addressee, Direction, Availability, Nature, Medium, Topic, and Change in Location, are explained below.

of On-going Conversations

This is the number of distinct conversations or communication interactions occurring at the time of observation. A conversation or interaction is defined as a speaker or individual addressing or interacting with one or more individuals. Thus, the number of conversations or communication interactions equals the number of persons speaking or interacting at the instant of observation. The number of conversations or interactions may vary from none at all, to the more common instance of one or two conversations or interactions, up to situations in which the entire group is speaking or interacting simultaneously.

Codes

1,2,3,..., All (A)

: The exact number of persons interacting is represented by the appropriate numeral. The

letter "A" is used when all or an unidentifiably large number of groups are conversing or interacting simultaneously as when laughing at a joke

- | | |
|----------------------|---|
| No Communication (N) | : No communication at the time of observation as when there is silence due to transition from one speaker or topic to the next |
| No Observation (X) | : When unable to code due to observer confusion, inattention, observer break, etc.
Comment desirable |
| Other (O) | : Any type of activity other than communication interactions, e.g., voting, coffee and lunch breaks, recesses. Requires explanation in comments section |

When two, three, or more simultaneous conversations or interactions are observed, the number of simultaneous interactions is recorded, but only the primary communication interaction, i.e., that conversation or interaction continuing from the previous observation or the interaction judged by the observer to be most pertinent to the continuing meeting dialogue, is considered in completing subsequent information categories. A remark is made in the comments section to indicate whether the secondary interaction(s) was public (P) or private (X) as defined in the "Availability" category.

When the "A," "N," "X," and "O" codes are used, it is inappropriate to code other categories of information with the possible exceptions of the Topic and Change in Location categories. For example, when the "A" or "O" codes are used and the topic of discussion remains unchanged it may be appropriate to code Topic as explained below. Similarly, Change in Location may be coded any time a participant moves around during the meeting.

Speaker

The person speaking or interacting at the time of observation is identified by code number.

Code

- | | |
|--------------------------|--|
| Participant Number (ID#) | : Each group member is assigned an identification number by the observer. That number is used in referring to this |
|--------------------------|--|

individual subsequently. Numbers are usually assigned to all members present at the start of the meeting according to their seating order, and thereafter sequentially as new participants arrive or take part in the meeting. If possible, a comment should be made to identify participant ID#'s with group status, e.g., chairman, secretary, treasurer

Addressee

In all instances where a specific participant is being spoken to or interacted with at the time of observation, that person is identified as the addressee and indicated as such on the observation sheet by code number. Specific address is inferred from named address, speaker eye gaze or eye contact, dialogue content, or previous situation context (e.g., when the speaker is responding to the addressee's previous question). The "All" code is used only when no particular addressee is discernible or intended.

Codes

- | | |
|--------------------------|--|
| Participant Number (ID#) | : The identification number (same as above for Speaker) of the person addressed by the speaker |
| All (A) | : When the speaker is addressing the group as a whole and no specific addressee is intended |

Direction

Communication interactions are classified as either uni-directional presentations or interactive discussion.

Codes

- | | |
|------------------|--|
| Presentation (P) | : A predominantly uni-directional interaction as when the speaker gives a lecture or speech, or presents a report to the group. Characterized by at least some of the following: formal, scheduled or requested, given from a podium, speaker has control of floor (not subject to interruption), lengthy, discourse presents previously undiscussed material in a structured manner |
|------------------|--|

Discussion (D)

: Interactive discourse or interaction among members to elaborate one specific topic. Interactions characterized by informality, spontaneity, speaker assuming control of floor but subject to interruptions, brevity of interaction

Availability

Interactions are classified according to their availability or access to participants.

Codes

Public (P)

: Communication, whether addressed to one or all, which is available (audible, visible) to all group members

Private (X)

: Communication which is reasonably unavailable to persons other than the intended receiver due to deliberate efforts by the speaker to be covert, e.g., whispering, passing notes

Nature

Each interaction is classified as one of the following:

Codes

Statement of Fact (F)

: Statement of factual information, including statement of opinion or position, that is not in reply to a specific question

"The committee will meet next Tuesday."

"I think the matter is resolved."

Question (Q)

: An implicit or explicit interrogatory statement which demands clarification from another person

"What is the next item on the agenda?"

"You want me to do it?"

- Response to Question (R) : A statement of fact (see above) given in reply to a previous question
- Control (C) : Any statement intended to control or direct others, e.g., instructions, all imperatives
- Social (S) : Any discourse which does not contribute to the purpose of the meeting. Though often of a social or personal nature, it may be related to the topic under discussion but irrelevant to the purpose
- "How's your family?"
 "Wouldn't you know Joe would
 luck out on the duty roster."

Medium

Each communication interaction is classified by oral or non-oral medium.

Codes

- Oral (O) : Any spoken utterance regardless of grammatical content
- Written (W) : Any message handwritten or hand drawn for the immediate use of others, e.g., writing or drawing on a blackboard, writing a note on a scratch pad (if content is visible to others)
- Gesture (G) : Body movements, positioning, or facial expressions specifically augmenting or supplementing the information content of other mediums especially oral, e.g., holding up two fingers to represent the number two, indicating a dimension by using one's hands, pointing to something with one's arm or a toss of the head, shrugging one's shoulders as a negative reply. Facial expressions connoting common emotional states (smiles, frowns) and nervous gestures (tics) are not coded

Physical Exchange (P) : The transfer of any physical object between participants, e.g., passing a note, handing over a document to be signed; or physically contacting another person, e.g., slapping on the back, shaking hands in greeting

If necessary, more than one medium code may be used to describe the interaction as when the speaker is explaining orally what he is writing on the blackboard (OW) or when he is gesturing as he speaks (OG). In this context, a fifth medium, Reading (R) is possible in combination with oral (OR). This code is used when the speaker is reading aloud and verbatim from text.

Topic

Each topic dealt with at the meeting, that is, each subject of discussion, is consecutively numbered and the topic number recorded at each observation to indicate how many topics were dealt with and how long each was under discussion. What defines or delimits particular topics must be determined from the on-going conversation and content. Topics should be construed as broadly as possible to minimize confusion with "issues" within topic areas. Typically, topics correspond to items listed on an agenda. Topics will generally remain the same over the period of several observations, but in the case of topics dealt with very briefly (less than one 30 second observation interval) it may be necessary to record their occurrence at other than a normal observation time.

Change in Location

Whenever a participant moves about within the meeting room, the change in his location is noted by recording the participant's ID#. If possible, the reason for the movement is noted in the comments section. A change in location may result when a person goes to the front of the room to assume the floor as speaker, changes seats, gets up to get coffee, or enters or exits the room as when arriving late or leaving early. Unlike previous categories of information, changes in participant location are not directly related to the communication interaction. Rather, this category is simply a record of incident frequency that is recorded every time a participant changes location. The notation is recorded on the observation sheet adjacent the time interval nearest the movement's occurrence.

Code

Participant Number (ID#) : Whenever a participant moves to a new location within the meeting area, his identification number is recorded.

Appendix B
Supplemental Communication Aid
Information Card

The Supplemental Communication Aid Information Card shown in Figure 3 is used to record information about supplemental communication aids used during a meeting. Because some of the information requested on the card may be inappropriate or indiscernible for the particular aid observed, portions of the card may be left blank. To the extent possible, the appropriate response is checked for each of the following categories of information.

Distributed by. By whom or how the aid (or its contents) was distributed:

Speaker	: The aid was distributed by the speaker
Chairman	: The aid was distributed by the chairman
Secretary	: The aid was distributed by the secretary
Other	: The aid was distributed by another person or means

More than one response may be appropriate as when the chairman who is distributing the aid is also the speaker. In that case, both Speaker and Chairman should be checked.

Distributed to. To whom the aid (or its contents) was distributed or available:

Speaker	: Only the speaker had access to the aid or its contents. The use of lecture notes or speech outlines by the speaker does not constitute use of a supplemental aid
Some	: Only some of the members had access to the aid, e.g., only a few copies of the aid were available and were shared among members

All : Each member had access to the aid

Preparation. How the aid was made ready for use:

Prepared : The aid was prepared prior to use, e.g., before the meeting

On-the-Spot : The aid was prepared as it was used

Content. The estimated percentage of the aid's content that is textual, statistical, graphic, and pictorial.

Use. The time frame within which the aid was used:

Immediate : Used when distributed

Future : Will be used at some later time

Purpose. Why the aid was distributed and used:

Information : To supply information

Action : To submit for review and/or approval, e.g., to obtain authorization signatures

Description. A brief written description of the aid, e.g., financial report, table of estimated costs, picture of building layout.

Comments/Problems Encountered, etc. An account of any situations arising from the use of the aid considered to be of utility to the study.

Appendix C

Participant Questionnaire



The Johns Hopkins University

Study of Meeting and Conference Behavior

PARTICIPANT QUESTIONNAIRE

Your answers to the following questions will be most useful to us. Some of the questions may be answered before the meeting, some only after. Please, however, complete all the questions. At the end of the meeting, return this questionnaire to one of the observers.

Please do not put your name on the questionnaire.

To mark your answers, please put a check mark between the pair of parentheses that best matches your choice.

1. How far in advance of this meeting were you notified that it would be held?

- ☐ Minutes
- ☐ Hours
- ☐ Days
- ☐ Weeks
- ☐ Months
- ☐ Meeting is routinely scheduled, e.g., meets every Friday

2. How far did you travel to attend this meeting?

- ☐ Meeting was held in my office
- ☐ Out of my office but within my building
- ☐ To another building at the same location
- ☐ To another location but within the metropolitan area
- ☐ Out of town (_____ miles)

3. How long did it take you to reach the site of this meeting?

- ☐ Less than 10 minutes
- ☐ 10 to 30 minutes
- ☐ More than 30 minutes

4. Did the meeting start on time?

- ☐ Started early
- ☐ On time or within 10 minutes of the prearranged starting time
- ☐ 10 to 30 minutes late
- ☐ More than 30 minutes late

5. While you are here, did you or do you intend to take care of other business aside from attending this meeting?

- ☐ Yes
- ☐ No

If yes, please specify. _____

6. Which of the following describe the meeting you just attended? (Check more than one if appropriate)

- ☐ There was assigned seating
- ☐ There was a chairman
- ☐ There was a secretary
- ☐ Minutes of the last meeting were read or were available
- ☐ There was an agenda
- ☐ Formal procedural rules were followed

7. What was your role at this meeting?

- ☐ Chairman
- ☐ Secretary
- ☐ Participant other than chairman or secretary
- ☐ Nonparticipant

8. Which of the following audio-visual aids were used during the meeting? (Check more than one if appropriate)

- ☐ Document (printed matter, xerox copies, etc.)
- ☐ Handwritten notes
- ☐ Blackboard
- ☐ Chart, poster
- ☐ Audio recording
- ☐ Vu-graph, opaque projection
- ☐ Slides
- ☐ Film
- ☐ Video tape
- ☐ Scale model, sample
- ☐ Others: _____

(specify)

9. What was the most important reason for having this meeting? _____

_____ List any additional reasons in
order of importance. _____

10. Which of the following was a purpose of this meeting? (Check more than one if appropriate)

- ☐ Administer or supervise something; Set policy
- ☐ Plan, organize, or coordinate something; Delegate responsibility
- ☐ Evaluate something or someone
- ☐ Tend to personnel matters (recruit or hire someone, discipline someone, express grievances, etc.)
- ☐ Work on or prepare something
- ☐ Present something (report, demonstration, etc.) to the group
- ☐ Discuss something; Exchange information; Get advice or feedback on something
- ☐ Review progress; Bring people up-to-date
- ☐ Solve a problem; Generate ideas (brainstorm)
- ☐ Reach a decision about something
- ☐ Get to know someone; Meet someone
- ☐ Observe or inspect something
- ☐ Train or teach someone; Study or learn something
- ☐ Buy or sell something
- ☐ Others: _____

(specify)

(Please turn the page)

11. Could the meeting purpose(s) have been accomplished without getting everyone together to meet face-to-face?

() Yes
() No

If it could have, suggest alternatives for doing so. _____

Rate the following seven questions on a scale from 0 to 5. Please show your rating by putting a check mark on one of the six lines.

12. How convenient was it for you to travel to this meeting?

Not at all _____ Very Convenient
Convenient 0 _____ 5

13. How urgent was the business that was conducted during this meeting?

Not at all _____ Very Urgent
Urgent 0 _____ 5

14. How confidential was the business that was discussed during the meeting?

Not at all _____ Very Confidential
Confidential 0 _____ 5

15. How effective was this meeting in accomplishing the purpose(s) for which it was called?

Not at all _____ Very Effective
Effective 0 _____ 5

16. How comprehensively did the meeting deal with any points you raised?

Not at all _____ Very Comprehensively
Comprehensively 0 _____ 5

17. How necessary or important was this meeting?

Not at all _____ Very Important
Important 0 _____ 5

18. How disruptive was it to have the observer sitting in on this meeting?

Not at all _____ Very Disruptive
Disruptive 0 _____ 5

Thank you for your help and cooperation.

Appendix D

Informed Consent Form and Cover Letter



THE JOHNS HOPKINS UNIVERSITY • BALTIMORE, MARYLAND 21218

INFORMED CONSENT FORM

I have been informed of the purpose and nature of the research proposed by The Johns Hopkins research group. I understand that the study involves the observation of meetings which are conducted in various types of business, educational, and governmental settings, and that from the information obtained the Investigators hope to be better able to explain how people conduct meetings of all types.

The Investigators have explained to my satisfaction how information about this meeting is to be collected. I understand that observers will be present to record the nature of participant interactions, that no tape recordings nor other permanent records of what is actually said will be taken, and that the observers may be asked to leave at any time. I am also aware that a research questionnaire will be distributed to all participants, and that completion of this questionnaire is strictly anonymous and voluntary.

I have been assured and am convinced that the research is for scientific purposes and that all data collected will be held in strict confidence. Therefore, as chairman (or person in charge) of this group, I agree on behalf of myself and the other participants at this meeting to take part in this study entitled "Study of Meeting and Conference Behavior".

Signed: _____
(Printed name) (Signature)

Observer(s): _____ Date: _____



THE JOHNS HOPKINS UNIVERSITY • BALTIMORE, MARYLAND 21218

DEPARTMENT OF PSYCHOLOGY

Dear Respondent:

We are engaged in a research project to study meetings conducted in various types of business, educational, and governmental settings. From the information we obtain by observing meetings such as yours today, we hope to be better able to explain how people conduct meetings of all types. We are looking for a general understanding of how meetings are conducted and what functions or purposes they serve. We are in no way concerned with any one person, his job, or the organization with which he is associated. Our interest is entirely academic and scientific. Therefore, be assured that neither your name nor your identity will be associated with any of the information we collect.

During this meeting we will be observing how you and the other participants interact to meet the objectives of this meeting. We will not be tape-recording nor making any other permanent records of what is actually said. If, however, at any time, matters which you consider to be confidential or privileged come up for discussion, please feel free to ask the observers to stop observing and to leave the room until such time as you feel they can return. We also ask that you please fill out the attached questionnaire. The information on this questionnaire cannot be obtained by observation. As a participant, you are our only source for this information and so, it is very important that you give us your best answers to these questions.

We have secured permission from the chairman (or person in charge) to observe this meeting and to distribute the questionnaire but should you object to our presence please feel free to tell the chairman or one of the observers. If you have any questions about this research please ask an observer or contact us at The Johns Hopkins University. The telephone number there is: (301) 338-7088.

Sincerely,

Professor Alphonse Chapanis
Mr. Mark A. Brecht

Appendix E
Descriptive Statistics for 67
Dependent Variables

Table E1
Descriptive Statistics for 67 Dependent Variables

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
DELAY								
Academic	16	6.281	5.250	5.574	.941	.858	.000	20.000
Business	16	9.625	6.000	15.853	3.342	12.294	.000	66.000
Government	16	14.469	6.250	21.442	2.780	8.229	.000	85.000
All Meetings	48	10.125	6.000	15.760	3.492	13.399	.000	85.000
DELAY (when observed)								
Academic	13	7.731	6.875	5.166	1.036	1.309	1.000	20.000
Business	12	12.833	7.500	17.257	3.108	10.232	1.000	66.000
Government	14	16.536	7.000	22.219	2.665	7.472	4.000	85.000
All Meetings	39	12.462	7.042	16.653	3.308	11.485	1.000	85.000
MTGTIME								
Academic	16	61.969	59.500	33.438	-.023	-.807	3.500	119.000
Business	16	91.094	66.500	75.759	1.357	2.155	2.000	294.000
Government	16	100.250	68.500	88.538	.832	-.465	7.000	269.000
All Meetings	48	84.438	66.250	70.445	1.357	1.626	2.000	294.000

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
NPRES								
Academic	16	10.938	8.500	10.748	1.901	3.287	2.000	40.000
Business	16	13.250	8.500	12.954	1.751	3.386	2.000	50.000
Government	16	18.000	8.500	17.671	1.220	.506	3.000	60.000
All Meetings	48	14.063	8.500	14.104	1.604	1.969	2.000	60.000
NPART								
Academic	16	7.500	7.500	4.082	.104	-1.060	2.000	14.000
Business	16	9.188	8.500	6.316	.890	.428	2.000	23.000
Government	16	14.250	8.500	11.475	.640	-1.491	3.000	31.000
All Meetings	48	10.313	8.250	8.275	1.392	1.181	2.000	31.000
PCTMT								
Academic	16	.927	.968	.111	-2.306	4.565	.615	1.000
Business	16	.953	.973	.091	-2.051	3.489	.693	1.000
Government	16	.924	.974	.109	-2.075	4.798	.597	1.000
All Meetings	48	.929	.973	.102	-2.058	3.559	.597	1.000

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
PCT 1								
Academic	16	.948	.981	.075	-1.942	3.477	.739	1.000
Business	16	.920	.952	.107	-2.025	4.108	.611	1.000
Government	16	.907	.933	.121	-1.900	3.461	.571	1.000
All Meetings	48	.925	.957	.102	-1.998	3.793	.571	1.000
PCT 2								
Academic	16	.031	.009	.043	1.639	2.200	.000	.145
Business	16	.055	.026	.068	1.541	1.784	.000	.229
Government	16	.075	.041	.109	2.571	7.622	.000	.429
All Meetings	48	.054	.023	.079	2.803	10.430	.000	.429
PCT 3								
Academic	16	.008	.000	.018	3.225	11.295	.000	.072
Business	16	.013	.001	.030	3.015	9.490	.000	.115
Government	16	.009	.000	.019	2.580	6.453	.000	.067
All Meetings	48	.010	.000	.023	3.121	10.414	.000	.115

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
PCT 4								
Academic	16	.005	.001	.016	3.705	14.085	.000	.064
Business	16	.002	.001	.008	4.000	16.000	.000	.031
Government	16	.001	.000	.003	3.075	10.047	.000	.012
All Meetings	48	.003	.000	.010	5.012	27.306	.000	.064
PCT 5								
Academic	16	.001	.000	.004	4.000	16.000	.000	.015
Business	16	.000	.000	.002	4.000	16.000	.000	.008
Government	16	.001	.000	.003	4.000	16.000	.000	.010
All Meetings	48	.001	.000	.003	4.189	17.474	.000	.015
PCTALL								
Academic	16	.006	.000	.009	1.274	.289	.000	.026
Business	16	.009	.000	.013	1.352	.563	.000	.038
Government	16	.008	.000	.011	1.243	.274	.000	.033
All Meetings	48	.008	.000	.011	1.322	.594	.000	.038

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
NSIM								
Academic	16	5.688	2.500	6.681	.932	-.567	.000	18.000
Business	16	15.813	6.500	22.921	2.313	5.735	.000	86.000
Government	16	16.500	6.500	30.199	3.666	12.343	.000	124.000
All Meetings	48	12.667	5.500	22.314	3.596	14.866	.000	124.000
PSIM								
Academic	16	.052	.019	.075	1.942	3.475	.000	.261
Business	16	.080	.048	.107	2.025	4.105	.000	.389
Government	16	.093	.042	.121	1.900	3.461	.000	.429
All Meetings	48	.075	.044	.102	1.998	3.792	.000	.429
PSIM (when observed)								
Academic	10	.083	.046	.081	1.526	1.640	.013	.261
Business	12	.107	.065	.112	1.820	3.042	.004	.389
Government	13	.115	.077	.124	1.736	2.696	.004	.429
All Meetings	35	.103	.074	.107	1.728	2.493	.004	.429

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
PMTNCOM								
Academic	16	.038	.019	.254	2.888	9.348	.000	.219
Business	16	.015	.008	.022	2.301	5.400	.000	.082
Government	16	.020	.007	.027	1.410	.846	.000	.085
All Meetings	48	.024	.010	.038	3.345	14.801	.000	.219
PMTOTH								
Academic	16	.022	.000	.048	2.441	5.621	.000	.167
Business	16	.048	.008	.094	2.302	4.377	.000	.307
Government	16	.046	.000	.093	2.650	7.548	.000	.348
All Meetings	48	.039	.000	.080	2.631	6.671	.000	.348
PMTOTH (when observed)								
Academic	6	.060	.013	.064	1.079	.051	.008	.167
Business	9	.086	.023	.113	1.503	.774	.008	.307
Government	7	.106	.049	.120	1.649	2.882	.003	.348
All Meetings	22	.085	.048	.101	1.538	1.509	.003	.348

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
PMTNOBS								
Academic	16	.013	.001	.048	3.970	15.826	.000	.191
Business	16	.001	.000	.003	2.469	4.906	.000	.010
Government	16	.009	.000	.017	2.326	5.739	.000	.063
All Meetings	48	.008	.000	.029	5.699	35.206	.000	.191
NSPEAKER								
Academic	16	6.500	6.500	3.759	.206	-1.270	2.000	13.000
Business	16	6.938	6.500	4.553	.749	-.059	2.000	17.000
Government	16	10.688	7.500	8.538	1.410	1.154	3.000	31.000
All Meetings	48	8.042	6.750	6.164	1.846	4.316	2.000	31.000
NSP 25								
Academic	16	5.125	5.167	4.129	.171	-1.296	.000	12.000
Business	16	5.625	4.500	4.843	.693	-.333	.000	16.000
Government	16	9.438	6.500	9.237	1.431	.956	1.000	31.000
All Meetings	48	6.729	5.500	6.629	1.776	3.999	.000	31.000

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
PSP 25								
Academic	16	.624	.825	.357	-.970	-.569	.000	1.000
Business	16	.662	.756	.312	-1.183	.712	.000	1.000
Government	16	.751	.837	.253	-.978	-.291	.250	1.000
All Meetings	48	.679	.821	.309	-1.089	.115	.000	1.000
NSP 50								
Academic	16	1.000	1.000	.730	.000	-.907	.000	2.000
Business	16	.813	.700	.834	.391	-1.443	.000	2.000
Government	16	1.188	1.250	.981	.062	-1.197	.000	3.000
All Meetings	48	1.000	.971	.851	.217	-1.076	.000	3.000
PSP 50								
Academic	16	.247	.132	.284	1.517	2.030	.000	1.000
Business	16	.177	.075	.214	.759	-1.273	.000	.500
Government	16	.240	.137	.260	.963	-.373	.000	.750
All Meetings	48	.221	.126	.251	1.173	.713	.000	1.000

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
NSP 75								
Academic	16	.313	.227	.479	.895	-1.391	.000	1.000
Business	16	.375	.300	.500	.571	-1.934	.000	1.000
Government	16	.000	.000	.000	.000	.000	.000	.000
All Meetings	48	.229	.149	.425	1.331	-.241	.000	1.000
PSP 75								
Academic	16	.097	.005	.175	1.770	2.052	.000	.500
Business	16	.114	.010	.197	1.580	.845	.000	.500
Government	16	.000	.000	.000	.000	.000	.000	.000
All Meetings	48	.071	.004	.157	2.237	3.635	.000	.500
NSP 100								
Academic	16	.063	.033	.250	4.000	16.000	.000	1.000
Business	16	.125	.071	.342	2.509	4.898	.000	1.000
Government	16	.063	.033	.250	4.000	16.000	.000	1.000
All Meetings	48	.083	.045	.279	3.113	8.025	.000	1.000

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
PSP 100								
Academic	16	.031	.017	.125	4.000	16.000	.000	.500
Business	16	.047	.018	.136	3.030	9.093	.000	.500
Government	16	.009	.005	.036	4.000	16.000	.000	.143
All Meetings	48	.029	.005	.107	3.941	15.124	.000	.500
NADD								
Academic	16	6.063	6.500	3.336	.258	-1.132	2.000	12.000
Business	16	7.188	7.000	5.036	1.066	.749	2.000	19.000
Government	16	10.125	6.000	8.350	1.429	1.471	3.000	31.000
All Meetings	48	7.792	6.500	6.074	1.854	4.259	2.000	31.000
NAD 25								
Academic	16	5.063	5.500	3.941	.134	-1.063	.000	12.000
Business	16	6.313	5.500	5.570	.955	.421	.000	19.000
Government	16	9.500	5.500	8.877	1.259	1.023	1.000	31.000
All Meetings	48	6.958	5.500	6.601	1.603	3.231	.000	31.000

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
PAD 25								
Academic	16	.677	.871	.395	-.990	-.765	.000	1.000
Business	16	.740	.899	.313	-.991	.185	.000	1.000
Government	16	.824	.987	.259	-1.337	.320	.333	1.000
All Meetings	48	.747	.880	.326	-1.150	.067	.000	1.000
NAD 50								
Academic	16	.813	.833	.655	.197	-.373	.000	2.000
Business	16	.625	.389	.806	.845	-.838	.000	2.000
Government	16	.563	.389	.727	.942	-.284	.000	2.000
All Meetings	48	.667	.556	.724	.610	-.841	.000	2.000
PAD 50								
Academic	16	.240	.129	.290	1.491	1.864	.000	1.000
Business	16	.145	.008	.204	1.034	-.668	.000	.500
Government	16	.155	.013	.229	1.532	1.502	.000	.667
All Meetings	48	.180	.095	.242	1.463	1.708	.000	1.000

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
NAD 75								
Academic	16	.188	.115	.403	1.772	1.285	.000	1.000
Business	16	.188	.115	.403	1.772	1.285	.000	1.000
Government	16	.063	.033	.250	4.000	16.000	.000	1.000
All Meetings	48	.146	.085	.357	2.072	2.392	.000	1.000
PAD 75								
Academic	16	.083	.019	.183	1.913	2.103	.000	.500
Business	16	.083	.019	.183	1.913	2.103	.000	.500
Government	16	.021	.011	.083	4.000	16.000	.000	.333
All Meetings	48	.062	.014	.156	2.243	3.442	.000	.500
NAD 100								
Academic	16	.000	.000	.000	.000	.000	.000	.000
Business	16	.063	.033	.250	4.000	16.000	.000	1.000
Government	16	.000	.000	.000	.000	.000	.000	.000
All Meetings	48	.021	.011	.144	6.928	48.000	.000	1.000

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
PAD 100								
Academic	16	.000	.000	.000	.000	.000	.000	.000
Business	16	.031	.017	.125	4.000	16.000	.000	.500
Government	16	.000	.000	.000	.000	.000	.000	.000
All Meetings	48	.010	.005	.072	6.928	48.000	.000	.500
PALLAD								
Academic	16	.310	.296	.254	.810	.989	.000	.928
Business	16	.258	.112	.294	1.159	.252	.000	.924
Government	16	.294	.236	.196	.312	-.779	.000	.678
All Meetings	48	.287	.236	.247	.820	.175	.000	.928
PCHSP								
Academic	16	.431	.435	.240	.326	.287	.052	.957
Business	16	.374	.346	.282	.576	-.657	.008	.899
Government	16	.244	.178	.211	1.650	3.387	.000	.844
All Meetings	48	.350	.344	.253	.693	-.250	.000	.957

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
PCHAD								
Academic	16	.256	.274	.169	-.112	-.826	.000	.568
Business	16	.244	.216	.193	.732	-.006	.000	.656
Government	16	.198	.174	.119	.587	-.460	.019	.429
All Meetings	48	.233	.229	.162	.530	-.182	.000	.656
PDISCUSS								
Academic	16	.858	.944	.233	-3.035	10.288	.058	1.000
Business	16	.839	.969	.254	-2.124	4.877	.076	1.000
Government	16	.794	.848	.190	-.789	-.574	.420	1.000
All Meetings	48	.830	.900	.224	-1.972	4.104	.058	1.000
PPRESENT								
Academic	16	.136	.049	.230	3.039	10.293	.000	.928
Business	16	.152	.013	.252	2.212	5.219	.000	.916
Government	16	.199	.102	.191	.848	-.483	.000	.580
All Meetings	48	.162	.069	.223	2.008	4.172	.000	.928

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
PPRESENT (when observed)								
Academic	12	.181	.089	.252	2.742	8.221	.005	.928
Business	8	.304	.203	.288	1.578	2.578	.027	.916
Government	14	.227	.159	.187	.736	-.709	.027	.580
All Meetings	34	.229	.130	.234	1.716	2.841	.005	.928
PPUBLIC								
Academic	16	.992	1.000	.013	-1.712	2.390	.957	1.000
Business	16	.990	.996	.015	-1.612	1.742	.952	1.000
Government	16	.990	.998	.014	-1.051	-.051	.959	1.000
All Meetings	48	.990	1.000	.014	-1.381	.876	.952	1.000
PPRIVATE								
Academic	16	.002	.001	.007	4.000	16.000	.000	.029
Business	16	.001	.000	.003	4.000	16.000	.000	.012
Government	16	.003	.000	.007	2.787	7.628	.000	.024
All Meetings	48	.002	.000	.006	3.715	13.709	.000	.029

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
PFACTUAL								
Academic	16	.649	.659	.132	-1.035	3.491	.286	.899
Business	16	.639	.646	.174	-.779	.156	.250	.870
Government	16	.603	.639	.127	-1.826	4.623	.224	.743
All Meetings	48	.630	.643	.144	-.950	1.411	.224	.899
PQUEST								
Academic	16	.119	.119	.065	.950	1.469	.029	.286
Business	16	.119	.078	.120	2.291	6.567	.013	.500
Government	16	.123	.111	.055	1.590	3.991	.055	.282
All Meetings	48	.120	.110	.083	2.251	8.364	.013	.500
PRESF								
Academic	16	.175	.170	.070	-.324	.206	.029	.286
Business	16	.165	.161	.091	-.391	-.165	.000	.308
Government	16	.219	.208	.077	1.338	1.018	.133	.400
All Meetings	48	.186	.177	.082	.054	.876	.000	.400

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
PCONTROL								
Academic	16	.033	.018	.040	1.962	3.645	.000	.143
Business	16	.034	.016	.036	1.349	.780	.000	.118
Government	16	.021	.010	.024	1.100	-1.160	.000	.068
All Meetings	48	.029	.016	.034	1.702	2.587	.000	.143
PCONTROL (when observed)								
Academic	13	.040	.021	.041	1.865	2.966	.006	.143
Business	14	.039	.046	.037	1.260	.388	.006	.118
Government	11	.030	.021	.024	.707	-1.189	.004	.068
All Meetings	38	.037	.021	.034	1.574	1.960	.004	.143
PSOCIAL								
Academic	16	.017	.006	.024	2.313	5.934	.000	.091
Business	16	.033	.018	.060	3.466	12.981	.000	.250
Government	16	.024	.005	.033	1.535	1.457	.000	.108
All Meetings	48	.025	.009	.042	3.754	18.022	.000	.250

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
PSOCIAL (when observed)								
Academic	11	.024	.016	.026	2.069	4.507	.005	.091
Business	11	.049	.031	.068	3.095	9.934	.009	.250
Government	11	.034	.019	.035	1.071	.071	.004	.108
All Meetings	33	.036	.019	.046	3.399	14.294	.004	.250
PORAL								
Academic	16	.968	.978	.039	-1.911	4.207	.855	1.000
Business	16	.970	.974	.024	-.521	-.503	.922	1.000
Government	16	.973	.978	.027	-1.306	1.479	.908	1.000
All Meetings	48	.970	.976	.030	-1.625	3.660	.855	1.000
PWRITTEN								
Academic	16	.003	.001	.011	4.000	16.000	.000	.044
Business	16	.000	.000	.000	.000	.000	.000	.000
Government	16	.000	.000	.000	.000	.000	.000	.000
All Meetings	48	.001	.000	.006	6.928	48.000	.000	.044

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
PWITTEN (when observed)								
Academic	1	.044	.044	-	-	-	.044	.044
Business	0	-	-	-	-	-	-	-
Government	0	-	-	-	-	-	-	-
All Meetings	1	.044	.044	-	-	-	.044	.044
PPHYS								
Academic	16	.001	.000	.002	4.000	16.000	.000	.008
Business	16	.000	.000	.000	.000	.000	.000	.000
Government	16	.000	.000	.000	.000	.000	.000	.000
All Meetings	48	.000	.000	.001	6.928	48.000	.000	.008
PPHYS (when observed)								
Academic	1	.008	.008	-	-	-	.008	.008
Business	0	-	-	-	-	-	-	-
Government	0	-	-	-	-	-	-	-
All Meetings	1	.008	.008	-	-	-	.008	.008

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
POW								
Academic	16	.002	.001	.007	4.000	16.000	.000	.029
Business	16	.000	.000	.002	4.000	16.000	.000	.008
Government	16	.000	.000	.001	2.692	6.398	.000	.004
All Meetings	48	.001	.000	.004	6.061	38.923	.000	.029
POW (when observed)								
Academic	1	.029	.029	-	-	-	.029	.029
Business	1	.008	.008	-	-	-	.008	.008
Government	2	.004	.004	.001	-	-	.003	.004
All Meetings	4	.011	.005	.012	1.853	3.470	.003	.029
POP								
Academic	16	.002	.000	.006	2.848	8.526	.000	.023
Business	16	.002	.000	.005	2.284	4.038	.000	.016
Government	16	.001	.000	.004	2.618	5.796	.000	.013
All Meetings	48	.002	.000	.005	2.607	6.388	.000	.023

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
POP (when observed)								
Academic	3	.013	.008	.008	1.731	-	.008	.023
Business	4	.009	.005	.007	-.083	-5.521	.002	.016
Government	2	.011	.011	.002	-	-	.010	.013
All Meetings	9	.011	.010	.006	.456	.059	.002	.023
POG								
Academic	16	.006	.001	.013	2.392	4.601	.000	.042
Business	16	.010	.001	.015	1.799	3.097	.000	.052
Government	16	.006	.001	.015	3.256	11.313	.000	.060
All Meetings	48	.007	.000	.014	2.317	4.860	.000	.060
POG (when observed)								
Academic	4	.023	.010	.019	.048	-5.394	.005	.042
Business	8	.020	.016	.016	1.095	1.238	.002	.052
Government	4	.024	.016	.024	1.749	3.185	.007	.060
All Meetings	16	.022	.016	.018	.934	-.148	.002	.060

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
POR								
Academic	16	.011	.001	.022	2.863	8.904	.000	.085
Business	16	.008	.000	.010	1.221	.440	.000	.032
Government	16	.009	.000	.017	2.862	8.978	.000	.065
All Meetings	48	.009	.000	.017	2.955	10.073	.000	.085
POR (when observed)								
Academic	6	.028	.011	.030	1.802	3.439	.006	.085
Business	8	.015	.016	.010	.504	-.642	.004	.032
Government	8	.017	.008	.021	2.106	4.710	.002	.065
All Meetings	22	.020	.010	.020	2.153	4.906	.002	.085
NTOPIC								
Academic	16	5.125	4.500	4.515	1.630	3.405	1.000	18.000
Business	16	3.563	2.500	3.829	2.591	7.619	1.000	16.000
Government	16	6.563	4.500	7.071	1.371	.957	1.000	23.000
All Meetings	48	5.083	3.100	5.355	1.821	2.990	1.000	23.000

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
NTOP 25								
Academic	16	3.875	2.500	4.717	1.989	4.718	.000	18.000
Business	16	2.375	1.100	4.031	2.925	9.444	.000	16.000
Government	16	5.688	3.500	7.319	1.392	1.004	.000	23.000
All Meetings	48	3.979	1.700	5.591	1.940	3.287	.000	23.000
PTOP 25								
Academic	16	.525	.600	.346	-.584	-.902	.000	1.000
Business	16	.411	.488	.332	.022	-1.096	.000	1.000
Government	16	.528	.31	.440	-.334	-1.898	.000	1.000
All Meetings	48	.488	.504	.372	-.225	-1.435	.000	1.000
NTOP 50								
Academic	16	.813	.500	.911	.414	-1.762	.000	2.000
Business	16	.500	.227	.816	1.260	-.122	.000	2.000
Government	16	.188	.071	.544	3.030	9.093	.000	2.000
All Meetings	48	.500	.227	.799	1.175	-.353	.000	2.000

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
PTOP 50								
Academic	16	.142	.006	.179	.886	-.793	.000	.500
Business	16	.121	.011	.212	1.695	1.938	.000	.667
Government	16	.033	.006	.084	2.581	5.898	.000	.286
All Meetings	48	.099	.003	.171	1.709	2.074	.000	.667
NTOP 75								
Academic	16	.000	.000	.000	.000	.000	.000	.000
Business	16	.125	.071	.342	2.509	4.898	.000	1.000
Government	16	.188	.115	.403	1.772	1.285	.000	1.000
All Meetings	48	.104	.058	.309	2.676	5.838	.000	1.000
PTOP 75								
Academic	16	.000	.000	.000	.000	.000	.000	.000
Business	16	.052	.012	1.146	2.722	6.644	.000	.500
Government	16	.017	.005	.047	2.829	7.502	.000	.167
All Meetings	48	.023	.003	.089	4.428	20.344	.000	.500

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
NTOP 100								
Academic	16	.438	.389	.512	.279	-2.219	.000	1.000
Business	16	.563	.611	.512	-.279	-2.219	.000	1.000
Government	16	.500	.500	.516	.000	-2.308	.000	1.000
All Meetings	48	.500	.500	.505	.000	-2.089	.000	1.000
PTOP 100								
Academic	16	.333	.065	.435	.799	-1.188	.000	1.000
Business	16	.417	.333	.443	.426	-1.666	.000	1.000
Government	16	.422	.125	.481	.380	-1.982	.000	1.000
All Meetings	48	.391	.042	.445	.494	-1.586	.000	1.000
NCHANGE								
Academic	16	5.563	4.500	5.853	1.943	4.678	.000	23.000
Business	16	9.688	6.167	9.728	1.178	.327	.000	30.000
Government	16	21.500	8.500	25.340	1.490	1.938	.000	89.000
All Meetings	48	12.250	6.000	17.107	2.622	8.262	.000	89.000

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
NCHANGE (when observed)								
Academic	14	6.357	5.500	5.839	1.982	4.713	1.000	23.000
Business	15	10.333	6.333	9.708	1.134	.167	1.000	30.000
Government	15	22.933	11.750	25.550	1.427	1.746	1.000	89.000
All Meetings	44	13.364	6.333	17.454	2.842	7.713	1.000	89.000
NPERCHG								
Academic	16	2.813	2.100	2.428	1.207	1.383	.000	9.000
Business	16	4.188	4.167	3.250	.688	.504	.000	12.000
Government	16	8.688	4.500	9.357	.881	-.810	.000	26.000
All Meetings	48	5.229	3.500	6.295	2.040	3.856	.000	26.000
NPERCHG (when observed)								
Academic	14	3.214	2.300	2.326	1.323	1.526	1.000	9.000
Business	15	4.467	4.333	3.159	.695	.696	1.000	12.000
Government	15	9.267	4.750	9.384	.797	-.987	1.000	26.000
All Meetings	44	5.705	3.900	6.367	1.983	3.500	1.000	26.000

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
NENT								
Academic	16	1.313	.500	1.662	1.023	-.086	.000	5.000
Business	15	2.200	1.625	2.145	1.606	2.046	.000	7.000
Government	13	2.615	.429	4.891	2.154	4.320	.000	16.000
All Meetings	44 ^a	2.000	1.000	3.073	2.766	9.588	.000	16.000
NENT (when observed)								
Academic	8	2.625	2.500	1.408	.480	-.564	1.000	5.000
Business	13	2.538	1.875	2.106	1.676	1.825	1.000	7.000
Government	6	5.667	2.500	6.055	1.129	.491	1.000	16.000
All Meetings	27	3.259	2.083	3.369	2.455	7.211	1.000	16.000
NLEFT								
Academic	16	1.188	.389	1.759	1.438	.991	.000	5.000
Business	15	2.400	1.875	2.613	1.516	2.105	.000	9.000
Government	13	2.154	.429	3.693	2.413	6.489	.000	13.000
All Meetings	44 ^a	1.886	.900	2.721	2.229	6.084	.000	13.000

Table E1 (continued)

Group	N	Mean	Median	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
NLEFT (when observed)								
Academic	7	2.714	2.250	1.704	.618	-1.396	1.000	5.000
Business	11	3.273	2.375	2.533	1.565	1.766	1.000	9.000
Government	6	4.667	3.500	4.320	1.881	3.919	1.000	13.000
All Meetings	24	3.458	2.500	2.859	2.027	4.699	1.000	13.000
NAIDS								
Academic	16	3.313	3.000	2.869	.900	.605	.000	10.000
Business	16	6.750	3.833	7.523	1.617	1.540	.000	25.000
Government	16	6.563	4.000	7.624	2.010	4.325	.000	29.000
All Meetings	48	5.542	3.643	6.464	2.121	4.415	.000	29.000
NAIDS (when observed)								
Academic	13	4.077	3.750	2.629	1.040	.950	1.000	10.000
Business	15	7.200	4.000	7.561	1.576	1.302	1.000	25.000
Government	14	7.500	4.500	7.714	1.969	4.002	1.000	29.000
All Meetings	42	6.333	4.071	6.539	2.073	3.965	1.000	29.000

Table E1 (concluded)

Note. Whenever a variable was observed not at all or too infrequently to allow a particular statistic to be calculated because of the small N, a hyphen has been used in place of a data value.

^aData for the variables NENT and NLEFT were not recorded for four (one business and three government) meetings.

Appendix F
Correlation Matrix for 67
Dependent Variables

Table F1

Correlation Matrix for 67 Dependent Variables

	MTOTIME	DELAY	NPRES	NPART	PCTMT	PCT 1	PCT 2	PCT 3	PCT 4	PCT 5	PCTALL	PMTNCOM	PMTNOBS	PMTOTH	NSIM
MTOTIME		.08	.32	.55*	-.44	-.08	.08	.09	-.07	.04	.02	.04	-.05	.56*	.47*
DELAY			-.02	-.01	-.08	.08	-.09	-.03	.08	-.07	-.12	-.16	.08	.15	-.08
NPRES				.80*	-.15	-.44	.32	.56*	.44	.49*	.06	-.07	.16	.16	.46*
NPART					-.13	-.26	.22	.24	.14	.14	.11	-.12	.07	.20	.55*
PCTMT						.05	-.06	.06	-.26	.08	.04	-.30*	-.42	-.39*	.02
PCT 1							-.96*	-.76*	-.46*	-.37*	-.30	.01	-.31	.04	-.65*
PCT 2								.56*	.32	.41	.17	.02	.31	-.04	.54*
PCT 3									.50*	.79*	.29	-.04	.03	-.07	.69*
PCT 4										.36	-.05	-.05	.79*	.07	.23
PCT 5											.15	.05	-.06	-.10	.52*
PCTALL												-.14	-.15	.07	.37
PMTNCOM													.03	.16	-.14
PMTNOBS														.15	-.03
PMTOTH															.05
NSIM															
PSIM															
NSPEAKER															
NSP 25															
NSP 50															
NSP 75															
NSP 100															
PSP 25															
PSP 50															
PSP 75															
PSP 100															
PCHSP															
NADD															
NAD 25															
NAD 50															
NAD 75															
NAD 100															
PAD 25															
PAD 50															
PAD 75															
PAD 100															
PCHAD															
PALLAD															
PPRESENT															
PDISCUSS															
PPUBLIC															
PPRIVATE															
PFACTUAL															
POUEST															
PRESP															
PCONTROL															
PSOCIAL															
PVERBAL															
PWRITTEN															
PPHYS															
PVC															
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PVR															
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NTOPIC															
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PTOP 25															
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PTOP 75															
PTOP 100															
NCHANGE															
NPERCHG															
NENT															
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Table F1 (continued)

	PSIM	NSPEAKER	NSP 25	NSP 50	NSP 75	NSP 100	PSP 25	PSP 50	PSP 75	PSP 100	PCHSP	NADD	NAD 25	NAD 50	NAD 75
MTGTIME	.08	.64*	.62*	-.06	-.20	-.21	.46*	-.29	-.31	-.20	-.29	.67*	.65*	-.20	-.24
DELAY	-.08	.00	-.01	.15	-.00	-.11	.01	.02	.04	-.14	-.17	-.06	-.04	-.14	.04
NPRES	.14	.60*	.61*	-.39	-.24	.36	.50*	-.31*	-.32	.21	-.08	.62*	.66*	-.57*	-.33
NPART	.26	.86*	.86*	-.35	-.24	.10	.65*	-.55*	-.35	-.06	-.29	.90*	.92*	-.56*	-.38
PCTMT	-.05	-.08	-.06	-.10	.06	-.10	-.08	.06	.07	-.03	-.11	-.11	-.10	.06	-.03
PCT 1	-1.00*	-.34	-.33	-.02	.28	-.02	-.25	.15	.30	-.08	.28	-.19	-.22	.20	.30
PCT 2	.96*	.30	.28	.12	-.25	-.04	.18	-.05	-.27	.01	-.30	.18	.19	-.09	-.28
PCT 3	.76*	.30	.31	-.17	-.20	.11	.25	-.27	-.19	.19	-.12	.17	.21	-.36	-.18
PCT 4	.46*	.19	.20	-.06	-.14	.03	.17	-.16	-.12	.07	-.15	.00	.04	-.24	-.11
PCT 5	.57*	.18	.19	-.23	-.14	.03	.05	-.19	-.11	.46*	.16	.09	.11	-.23	-.10
PCTALL	.30	.15	.17	-.16	-.23	.14	.30	-.25	-.26	.10	-.09	.15	.18	-.20	-.29
PMTNCOM	-.01	-.08	-.09	.05	.19	-.06	-.08	.03	.12	-.02	.19	-.08	-.09	.10	.24
PMTNOBS	.31	.15	.14	.09	-.15	-.08	.10	-.02	-.12	-.08	-.21	.01	.03	-.06	-.11
PMTOTH	-.04	.09	.07	.07	-.11	.19	.10	-.09	-.10	-.07	.12	.17	.17	-.11	-.04
NSIM	.65*	.68*	.68*	-.20	-.20	-.09	.39	-.31	-.23	-.07	-.29	.56*	.57*	-.34	-.23
PSIM		.34	.33	.02	-.28	.02	.25	-.15	-.30	.08	-.28	.19	.22	-.20	-.30
NSPEAKER			1.00*	-.32	-.26	-.21	.68*	-.52*	-.36	-.23	-.49*	.94*	.94*	-.49*	-.38
NSP 25				-.39	-.25	-.18	.71*	-.56*	-.36	-.20	-.47*	.94*	.94*	-.52*	-.39
NSP 50					-.35	-.36	-.42	.77*	-.18	-.32	-.09	-.37	-.41	.69*	.00
NSP 75						-.16	-.34	-.04	.83*	-.15	.09	-.24	-.24	-.09	.62*
NSP 100							-.03	-.27	-.14	.91*	.65*	-.06	-.03	-.28	-.12
PSP 25								-.81*	-.60*	-.09	-.42	.65*	.70*	-.59*	-.66*
PSP 50									.17	-.24	.10	-.52*	-.58*	.81*	.32
PSP 75										-.12	.25	-.34	-.36	.03	.86*
PSP 100											.59*	-.15	-.11	-.25	-.11
PCHSP												-.34	-.35	.09	.34
NADD													.99*	-.47*	-.37
NAD 25														-.55*	-.40
NAD 50															.11
NAD 75															
NAD 100															
PAD 25															
PAD 50															
PAD 75															
PAD 100															
PCHAD															
PALLAD															
PPRESENT															
PDISCUSS															
PPUBLIC															
PPRIVATE															
PFACUAL															
PQUEST															
PRESP															
PCONTROL															
PSOCIAL															
PVERBAL															
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NCAHNGE															
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Table F1 (continued)

	NAD 100	PAD 25	PAD 50	PAD 75	PAD 100	PCHAD	PALLAD	PPRESENT	PDISCUSS	PPUBLIC	PPRIVATE	PFACUAL	POUEST	PRESP	PCONTROL
MTGTIME	-.15	.43	-.35	-.27	-.15	-.17	.13	.16	-.16	-.10	.21	-.03	-.04	.21	-.02
DELAY	-.09	.15	-.17	-.02	-.09	.10	.03	.06	-.05	.14	-.08	.11	-.23	.06	.10
NPRES	-.13	.58*	-.53*	-.33	-.13	-.58*	.68*	.73*	-.73*	-.24	.43	.09	-.12	.12	-.14
NPART	-.15	.63*	-.57*	-.38	-.15	-.49*	.47*	.49*	-.30*	-.22	.29	-.06	-.05	.30	-.09
PCTMT	.10	-.11	.11	.02	.10	.13	-.03	.04	-.05	.00	-.09	.01	-.04	-.01	.01
PCT 1	.11	-.31	.19	.30	.11	.29	-.39	-.46*	.47*	.37	-.29	-.20	.13	.20	.16
PCT 2	-.10	.22	-.09	-.28	-.10	-.17	.25	.33	-.34	-.22	.20	.12	-.08	-.12	-.16
PCT 3	-.06	.33	-.31	-.18	-.06	-.37	.51*	.64*	-.65*	-.42	.41	.25	-.15	-.28	-.06
PCT 4	-.04	.21	-.20	-.11	-.04	-.35	.41	.31	-.31	.01	.08	.14	-.03	-.18	-.07
PCT 5	-.04	.20	-.19	-.10	-.04	-.30	.50*	.65*	-.66*	-.35	.52*	.32	-.20	-.29	-.13
PCTALL	-.10	.34	-.25	-.29	-.10	-.30	.29	.08	-.13	-.91*	.20	.24	-.24	-.24	-.12
PMTNCOM	-.10	-.13	.08	.18	-.10	.05	-.19	-.07	.08	.05	.16	-.15	.15	.03	.24
PMTNCRS	-.04	.10	-.05	-.11	-.04	-.15	.07	-.09	.10	.14	-.04	-.08	.11	.03	-.08
PMTOTH	-.07	.17	-.16	-.07	-.07	-.13	.10	.01	-.01	-.08	.05	.08	-.06	-.01	-.09
NSIM	-.08	.37	-.33	-.23	-.08	-.32	.34	.39	-.41	-.39	.20	.13	-.10	-.07	-.12
PSIM	-.11	.31	-.19	-.30	-.11	-.29	.39	.46*	-.47*	-.37	.29	.20	-.13	-.20	-.16
NSPEAKER	-.14	.60*	-.52*	-.38	-.14	-.41	.31	.29	-.30	-.25	.29	-.13	.03	.27	-.01
NSP 25	-.13	.63*	-.56*	-.38	-.13	-.43	.32	.30	-.30	-.27	.30	-.12	.04	.25	-.00
NSP 50	-.17	-.39	.60*	-.03	-.17	.40	-.24	-.26	.27	.24	-.25	.00	-.07	.06	.07
NSP 75	-.08	-.35	.08	.63*	-.08	.20	-.25	-.15	.16	.26	-.17	-.11	.10	.05	-.11
NSP 100	.48*	.12	-.23	-.12	.48	-.28	.30	.34	-.35	-.24	.28	.31	-.18	-.25	-.15
PSP 25	-.09	.94*	-.81*	-.67*	-.09	-.63*	.50*	.33	-.34	-.30	.12	-.02	.02	.07	.04
PSP 50	-.13	-.31*	.94*	.30	-.13	.62*	-.47*	-.39	.40	.31	-.24	-.09	-.02	.14	.12
PSP 75	-.07	-.59*	.24	.90*	-.07	.43	-.41	-.24	.25	.28	-.14	-.08	.11	-.09	-.19
PSP 100	.65*	.06	-.21	-.11	.65*	-.26	.25	.32	-.33	-.26	.41	.38	-.18	-.41	-.10
PCHSP	.29	-.34	.15	.34	.29	.19	-.11	-.05	.05	.03	.11	.05	.15	-.32	.07
NADD	-.14	.59*	-.51*	-.37	-.14	-.37	.26	.25	-.26	-.28	.38	-.21	.07	.37	-.01
NAD 25	-.13	.65*	-.58*	-.40	-.13	-.44	.32	.31	-.31	-.31	.39	-.18	.06	.34	-.02
NAD 50	-.14	-.66*	.87*	.09	-.14	.69*	-.51*	-.53*	.54*	.29	-.28	-.13	-.01	.20	.14
NAD 75	-.06	-.68*	.31	.98*	-.06	.49*	-.46*	-.25	.26	.29	-.13	-.04	.14	-.15	-.22
NAD 100		-.11	-.06	1.00*		-.07	-.17	-.11	.11	.10	-.04	.22	-.01	-.34	.04
PAD 25			-.87*	-.69*	-.11	-.69*	.63*	.48*	-.49*	-.38	.24	.09	-.09	.01	.00
PAD 50				.31	-.11	.65*	-.50*	-.45*	.46*	.30	-.23	-.15	.02	.18	.14
PAD 75					-.06	.47*	-.46*	-.24	.26	.29	-.12	-.06	.16	-.15	-.24
PAD 100						-.07	-.17	-.11	.11	.10	-.04	.22	-.01	-.34	.04
PCHAD							-.70*	-.59*	.60*	.35	-.23	-.21	.06	.15	.17
PALLAD								.84*	-.35*	-.33	.22	.53*	-.44	-.27	-.24
PPRESENT									-1.00*	-.23	.38	.43	-.35	-.21	-.19
PDISCUSS											.27	-.39	-.44	.36	.22
PPUBLIC											-.60*	-.16	.17	.19	.08
PPRIVATE												-.10	.06	.01	.04
PFACUAL													-.84*	-.55*	-.44
POUEST														.11	.20
PRESP															.12
PCONTROL															
PSOCIAL															
PVERBAL															
PWRITTEN															
PPHYS															
PVG															
PVP															
PVR															
PVW															
NTOPIC															
NTOP 25															
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PTOP 25															
PTOP 50															
PTOP 75															
PTOP 100															
NCHANGE															
NPERCHG															
NENT															
NLEFT															
NAIDS															

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Table F1 (continued)

	PSOCIAL	PVERBAL	PWRITTEN	PPHYS	PVG	PVP	PVR	PVW	NTOPIC	NTOP 25	NTOP 50	NTOP 75	NTOP 100	PTOP 25	PTOP 50
MTGTIME	-.24	-.21	-.10	-.05	.35	-.03	.05	-.02	.27	.27	.03	-.13	-.08	.22	-.12
DELAY	-.08	.04	-.09	.01	-.05	.13	.08	-.04	.02	.02	-.06	.30	.02	.08	-.13
NPRES	-.28	-.59	.27	-.06	.24	-.01	.51	.22	.29	.29	-.01	-.00	-.10	.29	-.06
NPART	-.28	-.36	-.06	-.04	.26	-.03	.30	-.10	.43	.43	.06	.07	-.25	.33	-.05
PCTIME	.06	.24	.02	.09	-.15	-.10	-.28	-.02	.03	.06	-.26	-.05	.13	-.03	-.26
PCT 1	.02	.47	-.27	.00	-.31	.25	-.18	-.21	-.05	-.05	.09	.08	-.12	.05	.12
PCT 2	.01	-.30	.17	-.01	.25	-.24	.10	.12	.03	.04	-.10	-.08	.11	-.08	-.13
PCT 3	-.09	-.59	.41	-.06	.38	-.16	.19	.36	.06	.06	-.05	-.15	.14	.03	-.10
PCT 4	-.02	-.46*	.17	-.04	.11	-.11	.65	.14	.01	-.01	.22	-.06	-.08	.08	.25
PCT 5	-.13	-.65	.75	-.04	.32	-.10	.16	.70	.13	.13	-.06	-.08	.09	.13	-.12
PCTALL	-.08	-.40	.09	.22	.13	-.24	-.12	.03	.10	.11	-.21	.16	.02	-.03	-.15
PMTNCOM	-.02	-.13	.12	-.06	.20	.25	-.04	.16	-.05	-.06	.14	-.06	-.02	.06	.07
PMTNOBS	.11	-.20	-.04	-.04	-.10	-.04	.59*	-.04	.00	-.02	.21	-.05	-.11	-.02	.29
PMTOTH	-.10	-.17	-.07	-.07	.13	.02	.16	-.03	-.02	-.04	.19	.11	-.12	.01	.19
NSIM	-.15	-.49*	.04	-.02	.61*	-.17	.07	.00	.32	.32	-.00	-.08	-.05	.12	-.13
PSIM	-.02	-.47*	.27	-.00	.31	-.26	.18	.21	.05	.05	-.09	-.08	.12	-.05	-.12
NSPEAKER	-.22	-.28	-.14	-.00	.33	-.17	.16	-.18	.44	.43	.06	.02	-.20	.31	-.06
NSP 25	-.22	-.30	-.13	.01	.32	-.17	.18	-.17	.45*	.44	.05	.03	-.22	.33	-.05
NSP 50	.02	.36	-.17	.00	-.10	-.05	-.25	-.08	-.21	-.21	.06	-.16	.15	-.12	-.04
NSP 75	.25	.09	-.08	-.08	.18	.23	-.12	-.12	-.31	-.30	-.09	-.02	.25	-.36	-.09
NSP 100	-.18	-.36	.48*	-.04	-.15	.07	.26	.44	.04	.03	.10	.14	-.15	.04	.27
PSP 25	-.24	-.26	-.09	.09	.15	-.26	.23	-.11	.41	.41	.05	.11	-.33	.39	-.00
PSP 50	.09	.36	-.13	-.06	-.10	.10	-.27	-.06	-.33	-.32	-.10	-.21	.36	-.33	-.03
PSP 75	.45*	.17	-.07	-.07	-.04	.38	-.10	-.10	-.24	-.24	-.03	.06	.12	-.23	-.01
PSP 100	-.16	-.34	.65*	-.04	-.14	-.04	.13	.60*	-.06	-.08	.14	.07	-.08	-.02	.32
PCHSP	.09	-.06	.35	.06	-.18	.17	.01	.36	-.00	-.01	.14	.07	-.16	.05	.19
NADD	-.24	-.25	-.12	.01	.23	-.08	.12	-.14	.41	.40	.01	-.02	-.15	.28	-.10
NAD 25	-.25	-.29	-.09	.00	.23	-.11	.15	-.12	.41	.41	.01	.01	-.17	.28	-.09
NAD 50	.06	.39	-.14	.07	-.10	.12	-.34	-.04	-.24	-.23	-.04	-.32	.29	-.15	-.12
NAD 75	.40	.16	-.06	-.06	-.03	.38	-.10	-.03	-.20	-.20	.04	.05	.06	-.19	.03
NAD 100	-.09	.15	-.02	-.02	-.07	-.06	-.08	-.03	-.06	-.08	.28	-.05	-.15	-.06	.49*
PAD 25	-.28	-.37	.11	.06	.10	-.25	.27	.08	.33	.33	-.01	.16	-.25	.34	-.04
PAD 50	.10	.34	-.11	-.03	-.06	.13	-.28	-.07	-.30	-.29	-.09	-.26	.35	-.30	-.12
PAD 75	.46*	.18	-.06	-.06	-.07	.35	-.09	-.04	-.20	-.21	.03	.08	.04	-.20	.04
PAD 100	-.09	.15	-.02	-.02	-.07	-.06	-.08	-.03	-.06	-.08	.28	-.05	-.15	-.06	.49*
PCHAD	.28	.43	-.20	.17	-.24	.45*	-.30	-.12	-.06	-.06	-.02	-.21	.11	-.03	-.07
PALLAD	-.36	-.53*	.38	-.05	.27	-.22	.28	.30	.20	.19	.02	.15	-.15	.25	-.02
PPRESENT	-.29	-.55*	.51*	-.11	.28	-.05	.25	.45*	.16	.16	-.12	.11	-.02	.21	-.16
PDISCUSS	.29	.56*	-.51*	.10	-.29	.06	-.25	-.45*	-.16	-.17	.13	-.12	.02	-.21	.17
PPUBLIC	.08	.55*	-.37	-.16	-.09	.25	.07	-.30	-.03	-.05	.25	-.10	-.13	.04	.20
PPRIVATE	-.03	-.51*	.68*	-.04	-.04	-.13	.07	.64*	-.12	-.11	-.18	-.06	.26	-.03	-.18
PEACTUAL	-.39	-.26	.27	.08	.16	-.04	.04	.21	.13	.11	.19	-.02	-.16	.13	.22
PQUEST	.51*	.22	-.16	-.10	-.11	-.07	-.03	-.12	-.13	-.12	-.08	.10	.02	-.10	-.10
PRESP	-.30	.17	-.28	-.14	-.06	.09	.05	-.22	-.05	-.04	-.16	-.20	.26	-.08	-.20
PCONTROL	-.09	.17	-.13	.09	-.10	.05	-.10	-.09	.00	-.00	.07	-.02	-.02	.07	.03
PSOCIAL	.16	-.09	.06	-.15	.16	-.08	-.08	-.09	-.08	-.15	.25	-.01	-.12	-.13	
PVERBAL			-.57*	-.02	-.45*	-.04	-.57*	-.53*	-.19	-.19	.04	.11	-.01	-.12	.06
PWRITTEN				-.02	-.07	-.06	.17	.95*	-.08	-.08	-.09	-.05	.15	.00	-.09
PPHYS					-.07	-.06	-.08	-.03	.36	.37	-.09	-.05	.15	.20	-.09
PVG						-.07	-.05	-.08	.11	.10	.02	-.17	.13	-.02	-.12
PVP							.06	.03	.16	.17	-.12	-.14	.03	.10	-.15
PVR								.15	.21	.19	.23	-.05	-.30	.22	.27
PVW									-.13	-.12	-.14	-.07	.21	-.04	-.13
NTOPIC										1.00*	.15	.01	-.66*	.77*	.02
NTOP 25											.06	.00	-.61*	.75*	-.06
NTOP 50												-.13	-.63*	.27	.91*
NTOP 75													-.34	.17	.02
NTOP 100														-.73*	-.58*
PTOP 25															.16
PTOP 50															
PTOP 75															
PTOP 100															
NCHANGE															
NPERCHG															
NENT															
NLEFT															
NALDS															

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Table F1 (continued)

	FTOP 75	FTOP 100	NCHANGE	NPERCHG	NENT	NLEFT	NAIDS
MIGTIME	-.15	-.11	.60*	.47*	.39	.39	.61*
DELAY	.03	-.02	-.00	.01	.01	.22	-.01
NPRES	-.03	-.21	.67*	.77*	.46*	.31	.37
NPART	-.02	-.25	.80*	.90*	.65*	.48*	.51*
PCTMT	-.06	.13	-.24	-.18	-.23	-.13	-.16
PCT 1	.10	-.11	-.17	-.13	-.09	.03	-.27
PCT 2	-.11	.14	.13	.12	.10	-.01	.23
PCT 3	-.12	.03	.23	.15	.08	-.04	.30
PCT 4	-.05	-.15	.11	.10	.14	-.06	.03
PCT 5	-.06	-.05	.17	.08	-.02	-.03	.30
PCTALL	.11	.06	-.12	-.09	-.15	-.06	.12
PMTNCOM	-.17	-.05	.11	-.02	.06	.11	.08
PMTNOBS	-.07	-.08	.02	.03	.10	-.10	-.06
PMTOTH	.19	-.12	.25	.23	.23	.15	.19
NSIM	-.08	-.04	.42	.34	.24	.15	.68*
PSIM	-.10	.11	.17	.13	.09	-.03	.27
NSPEAKER	-.09	-.22	.78*	.70*	.46*	.37	.56*
NSP 25	-.07	-.24	.77*	.69*	.44	.36	.55*
NSP 50	-.25	.16	-.26	-.27	-.06	-.15	-.18
NSP 75	.14	.30	-.12	-.15	-.01	.04	.04
NSP 100	.21	-.18	-.07	.11	-.06	-.02	-.06
PSP 25	-.00	-.33	.39	.44	.32	.31	.23
PSP 50	-.21	.37	-.32	-.39	-.27	-.29	-.19
PSP 75	.26	.15	-.18	-.20	-.13	-.12	-.13
PSP 100	.11	-.13	-.13	-.05	-.10	-.06	-.05
PCHSP	.30	-.17	-.29	-.21	-.24	-.20	-.18
NADD	-.06	-.13	.79*	.76*	.46*	.38	.56*
NAD 25	-.04	-.19	.78*	.77*	.46*	.38	.55*
NAD 50	-.24	.22	-.37	-.47*	-.28	-.26	-.23
NAD 75	.23	.10	-.16	-.20	-.13	-.12	-.02
NAD 100	-.04	-.13	-.11	-.12	-.10	-.11	-.10
PAD 25	.02	-.27	.35	.44	.32	.32	.22
PAD 50	-.20	.34	-.32	-.42	-.30	-.30	-.22
PAD 75	.28	.10	-.17	-.21	-.13	-.13	-.07
PAD 100	-.04	-.13	-.11	-.12	-.10	-.11	-.10
PCHAD	-.10	.07	-.27	-.33	-.21	-.16	-.21
PALLAD	.05	-.22	.23	.36	.34	.28	.18
PPRESENT	-.01	-.11	.38	.48*	.36	.30	.28
PDISCUSS	.01	.11	-.37	-.47*	-.35	-.29	-.29
PPUBLIC	-.07	-.09	-.06	-.04	.11	.06	-.23
PPRIVATE	-.05	.10	.37	.26	.02	-.01	.30
PFACTUAL	-.17	-.16	-.22	-.13	.04	.08	-.02
PQUEST	.39	.04	.10	.02	-.08	-.19	-.03
PRESF	-.35	.21	.34	.32	.12	.16	.17
PCONTROL	-.12	-.04	.07	-.02	-.01	.05	-.10
PSOCIAL	.56*	.04	-.17	-.20	-.15	-.22	-.20
PVERBAL	.11	.06	-.22	-.25	-.14	-.10	-.45*
PWRITTEN	-.04	.04	-.09	-.08	-.05	-.05	.06
PPHYS	-.04	-.13	-.11	-.12	-.10	-.11	-.10
PVC	-.13	.08	.33	.20	.23	.16	.68*
PVP	-.11	-.01	.06	.11	.12	.11	-.01
PVR	-.07	-.28	.10	.27	.14	.09	-.01
PVW	-.06	.09	-.08	-.09	-.01	.00	.12
NTOPIC	-.07	-.64*	.29	.37	.17	.13	.10
NTOP 25	-.08	-.39*	.29	.36	.15	.12	.10
NTOP 50	-.06	-.56*	.02	.07	.23	.04	-.05
NTOP 75	.76*	-.30	-.00	.07	.04	.38	-.14
NTOP 100	-.26	.39*	-.06	-.21	-.13	-.20	.14
PTOP 25	.03	-.90*	.28	.35	.18	.21	-.05
PTOP 50	.00	-.52*	-.09	-.03	.11	-.01	-.15
PTOP 75		-.23	-.05	.00	.00	.18	-.15
PTOP 100			-.19	-.28	-.19	-.20	.13
NCHANGE				.39*	.63*	.47*	.49*
NPERCHG					.74*	.53*	.38*
NENT						.69*	.26
NLEFT							.24
NAIDS							

* $p < .001$

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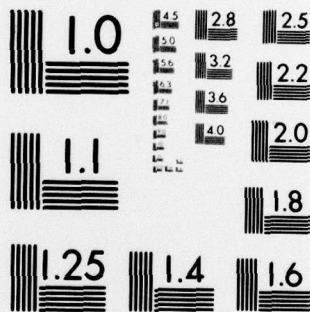
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Appendix G
Index of Inequality
of Participation

Hiltz (Hiltz et al., 1978) describes an index of inequality of participation that can be used to assess whether communication within one group is more or less equally distributed among all members of that group than is communication within other groups. That is, the index represents the inequality of distribution of communication interactions among group members and indicates, for example, whether one member interacted more than other members or whether all interacted about the same. The index compares the actual cumulative percentage of communication interactions, starting with the least active participant, to a theoretical cumulative percentage of equal contribution by all participants. The index yields a value of 0 if there is, in fact, total equality of participation, and 1 if there is total inequality, regardless of the size of the group. The numerator of the index ratio represents the mean difference between the proportions of interactions initiated by each of the participants and the proportion they would have initiated if each contributed an exactly equal share. The denominator consists of the maximum value which the sum of observed differences could possibly reach in a group that size if there was total inequality, i.e., if one of the members initiated all the interactions. Thus, the index compares observed inequality to the maximum possible for a group that size.

The index is computed as follows:

Let I = Index of inequality

N = Number of members in group

O_i = Observed cumulative proportion of interactions

E_i = Expected cumulative proportion if there were total equality of participation; equal to the cumulative proportion of the number of members of the group

$$I = \frac{\frac{1}{N} \sum_{i=1}^N (E_i - O_i)}{\frac{1}{2} (1 - \frac{1}{N})}$$

For example, for a group sized five, with total inequality, the results and the calculations would appear as follows:

<u>Participant</u>	<u>Percent of Interactions</u>	<u>O_i</u>	<u>E_i</u>	<u>(E_i - O_i)</u>
1	0	0	.2	.2
2	0	0	.4	.4
3	0	0	.6	.6
4	0	0	.8	.8
5	1.0	1.0	1.0	0
				Sum = 2.0

$$I = \frac{\frac{1}{5} (2.0)}{\frac{1}{2} (1 - \frac{1}{5})} = \frac{.4}{.4} = 1.0$$

For total equality, the calculations would be:

<u>Participant</u>	<u>Percent of Interactions</u>	<u>O_i</u>	<u>E_i</u>	<u>(E_i - O_i)</u>
1	20	.20	.2	0
2	20	.40	.4	0
3	20	.60	.6	0
4	20	.80	.8	0
5	20	1.00	1.0	0
				Sum = 0

$$I = 0$$

Note that the observed percentages must be rank ordered from smallest to largest and that the differences between the observed and expected proportions are not squared.

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